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BY

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COMPILED BY C. W. SHAW

EDITOR OF "GARDENING ILLUSTRATED"

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# PUBLISHERS' PREFACE.

No comprehensive book on the Kitchen and Market Garden has been written hitherto, and this is an attempt to fill up the void. All good gardeners well know that the practice most worthy of their attention, and as far as possible their imitation, is that of the best market gardeners near London and other large cities. Notwithstanding this, very little notice has been taken of market gardening in any books hitherto published on the kitchen garden. This was brought about by the fact that market gardeners are a class apart. Information concerning their work was not obtainable without some trouble, and the market gardener is usually too busy a man to write himself. Mr. W. Falconer and Mr. C. W. Shaw made, in connection with the *Garden* newspaper, what we believe to be the first attempt at long and systematic observation of the best culture as it is in London market gardens. The result is embodied in this book, which also contains the practice of the best private gardeners in England—among them being Mr. Thomas Baines, the late James Barnes, of Bicton, A. Dean, of Bedfont, Richard Gilbert, of Burghley, J. Groom, D. T. Fish, E. Hobday, J. Simpson, W. Tillery, and W. Wildsmith.

The question of market and kitchen gardening is of some national importance. It is not only desirable that our private gardens should be in the highest degree productive: the supply of our markets with good vegetables and salads is being now to a large extent undertaken by foreigners. There is no good reason why it should be so. If we take advantage of all our opportunities, we ought at least to supply our own markets with vegetables and salads without foreign aid. The publication, in a concise form, of the information necessary for the carrying out of every kind of market and kitchen garden cultivation in the best manner known up to the present time, will, it is hoped, be useful to this end and otherwise in all that concerns the cultivation of vegetable crops.

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# THE
# KITCHEN AND MARKET GARDEN.

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## Formation of the Kitchen Garden.

In selecting a site for a new kitchen garden, convenience sometimes prevails over all other considerations, and thus a bad situation is sometimes chosen and a really good one rejected. Gently sloping ground is most suitable for a kitchen garden, inasmuch as it can be more conveniently drained than when it is on a level, and moreover it can be more fully exposed to the direct rays of the sun, and the ground consequently kept drier and warmer—*i.e.*, if the inclination be in a proper direction. In no case should the ground slope towards the north or north-east, to be directly exposed to the cold winds which we usually get from that quarter in early spring—a time when all kitchen-garden crops most need warmth. A south-east or south-west aspect is not objectionable, but due south is perhaps preferable to all others. Steep slopes are, as a rule, objectionable, inasmuch as during heavy rains the soil becomes washed into the walks, and the drains get filled up, thereby causing endless trouble and annoyance. Especially is this the case after continuous drought, when the ground has in consequence become almost impervious to rain; the dry surface-soil is washed away from the roots of the plants, which are consequently left bare, and instead of the plants being benefited by the rain they are left in a worse condition than they were before it fell, inasmuch as their roots, being near the surface, are more directly exposed to the fierce rays of the sun, and soon become injured thereby. It is therefore obvious that if the ground slope at all, it should only be slightly. If, however, as sometimes happens, the only site available for a kitchen garden be naturally level, it is advisable to allow it to remain so, for a time at least; but it may by degrees be brought to the desired slope when such operations as digging or trenching are being performed, by each time working the soil to that end required to be the highest. Where it happens that the ground slopes in a direction contrary to the one required, it will be necessary to bring in soil from another quarter, unless there be sufficient depth of material to permit the difficulty to be overcome by levelling.

A kitchen garden should always be so far removed from the residence as to avoid the possibility of offensive smells arising from decaying vegetables being obnoxious to the inmates ; and it should as far as possible be situated so as to admit of its being sheltered to some extent from north and north-east winds, and also hidden from view from the residence or ornamental grounds. This may generally be effectively done by planting fast-growing evergreens or forest trees, and sometimes the desired shelter may be obtained by surrounding it with high banks and mounds judiciously planted. When selecting trees or shrubs for this purpose, preference should be given to those kinds that appear to thrive the most luxuriantly in the immediate neighbourhood. The extent of ground to be devoted wholly to vegetable culture must, of course, depend upon the demand. Nothing less than an acre will suffice for any residence except, perhaps, a mere cottage. The number of people to be supplied with vegetables in season must be taken into consideration, and also the climate and soil. Probably fourteen may subsist on the produce of an acre, where it is not expected to furnish more than an early crop of Potatoes. Another consideration is the means allowed to work the garden—a question affecting production quite as much as extent. It is much better to manage one acre thoroughly than to have two acres ill-managed. When it is intended to enclose the ground by walls, it should be remembered that it costs less, proportionally, to wall in two or three acres than it does one acre, and at the same time there is an extended wall surface for fruit trees. If the ground be not all required for vegetable crops, it can be employed in other ways. As to plan, the simpler it is the better. A parallelogram running east and west in such a way that the greatest extent of wall surface and borders may have a south aspect, is the usual and most approved form. If walls be employed, they should not be less than 12 ft. in height. The north wall might be made considerably higher than this with advantage—perhaps 16 ft. or 18 ft.—the east and west walls descending by ramps from each corner towards the south. This would not only increase the sheltering power of the walls, but would afford more room for training fruit trees upon them—a 12-ft. wall being too low for many kinds of fan-trained trees. When the area enclosed does not exceed more than three or four acres, an intersecting or middle wall is not to be recommended, as it necessitates a further sub-division of the ground and more walks, where these are thought necessary, and reduces the cropping space ; but in a six or eight acre garden such a wall is beneficial for the shelter it affords from cold winds—the boundary walls under such circumstances exerting hardly any influence in the central portions of the garden, over which the blast sweeps as over an open field. Within the walls the ground need only be divided into four quarters by well-made intersecting walks communicating with side-walks, which should run entirely round the square, leaving a 12-ft. or 14-ft. border between them and the wall. It has happily come into practice of late years to separate the vegetable and fruit gardens entirely from each other, and where this can be conveniently done a decided advantage is gained to both classes of produce. The tillage of the soil required for vegetable and fruit crops is of a widely different character; for whilst the vegetables are benefited by constant digging, trenching, and manuring of the soil, the fruit trees are often injured by such operations. It is almost, in short, impossible to cultivate a vegetable garden properly where fruit trees exist, without injury to their roots. Manure constantly applied near their roots is often productive of evil results. It is said by many to produce canker; one thing, however, is certain—that it has a tendency to promote rank growth, which most people are agreed is inimical to fruit-bearing, unless in the case of old worn-out trees. Where the vegetable garden is separate from the fruit department, walls are seldom used; nor are they necessary, for if sloping banks be thrown up all round and planted with a hedge, they answer admirably for early vegetables, and that side upon which the sun has no power can be used during summer for shade-loving subjects, such as Cresses, Salads, etc., or it will answer for many crops that are required to be retarded. Indeed, whatever aspect may be required for each individual subject, when banks are used, they can be accommodated.

## Soils.

In some respects this is a question subservient to that of situation, —for part of the soil can be brought from the neighbouring fields rather than sacrifice a site otherwise suitable. It is found that many kitchen garden crops thrive in soils of widely different character. There are some gardens in which most plants flourish well, except in very dry seasons, where the soil consists almost of pure red sand on a sandstone formation. In this case, however, other soil must be added. A good sandy loam is best for general purposes, and very light, or very heavy, clayey soils should be avoided. Otherwise no soil is bad that yields fair pasture, provided it is deep enough: but, as a rule, it will be not only desirable, but necessary, to trench the ground over to a depth of 2½ ft., or at least 2 ft., adding to it at the same time such materials in the shape of leaf-mould, manure, turf-scrapings, clay, general vegetable refuse, lime, etc., as may be found needful to improve the staple, and the improving process may be continued annually by trenching and re-turning as much ground as circumstances will permit.

As regards the properties of soils there has been so much controversy of opinion that, without expressing any ourselves, we reprint an article extracted from a prize essay by John Colman,* one of the most trustworthy authorities on the subject.

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* "Journal of the Royal Agricultural Society."

"The causes which operate in producing the fertility or barrenness of soils have hitherto to a great extent been shrouded in mystery, not from want of study, but owing to the difficulties which meet the inquirer at every step, and the fact that most important results frequently depend upon causes which have eluded the search of the experimenter. The science of chemistry, it was hoped, would afford the key wherewith to unlock the mysteries of Nature; but, though its discoveries have conferred much practical benefit on the agriculturist, it has, up to a very recent period, effected comparatively little towards settling the causes of fertility or sterility. The theories of scientific men led us to expect that fertility depended upon the presence of certain mineral substances, which were found invariably present in the ashes of plants; and the analysis of a soil, it was believed, would confirm the practical experience of the farmer; these hopes have been falsified, except in the few cases of almost simple soils, such as pure clays and sands. In all other instances, the analysis presented the existence, in varying proportions, of those substances supposed to induce fertility equally in the barren as the fertile soil. The proportion of the various ingredients was next proposed as the sign of quality; but researches into the amount of inorganic matter abstracted by each crop have demonstrated that soils of a mixed character contain abundant supplies of mineral food for numerous crops. It is probable that fertility depends more upon the peculiar condition of the saline matters, than their actual presence or absence in a soil; thus, for example, we can imagine a clay soil so full of water that the air could not penetrate and act upon the various salts, which, though of the right kind, might be in an insoluble and therefore useless condition; but the same soil, subjected to thorough drainage and pulverisation (physical change of its particles) might become very fertile, owing to the reviving influence of atmospheric action, and the increased temperature which would follow removal of the water, etc. It is for these reasons that fertility often appears to depend more upon physical than chemical causes, whereas the two are intimately combined; for instance, a pure sand may be physically in the best possible state, porous, warm, capable of retaining moisture, and yet totally barren, from the absence of those chemical compounds upon which the plant feeds; and, *vice versâ*, the storehouse may be full, Nature's laboratory may contain abundance, and yet the physical condition may be such as to prevent those further changes requisite before the food can be fit for use.

"Before entering more particularly into an examination of the physical properties of soils, it may be as well to glance very briefly at their origin. Soils are derived from three sources:—First, from the decomposition of the rock on which they rest. Secondly, from the decomposition of a drift formation, to which, in earlier days of geological knowledge, the term Diluvium was applied, on account of their supposed formation by the Noachian Deluge,—a view long *since* found untenable; and the name has given place to that of *erratic tertiaries*, because most of these beds seem referable to a period posterior to the tertiary deposit. Various theories have been broached to explain their formation; the most plausible refer them to a period immediately preceding the present, when the earth was about to emerge from its watery covering, and when the natural elevations of its surface would cause mighty currents, carrying away in their course vast quantities of matter from the higher points, depositing them according to gravity at nearer or greater distances from the parent bed: the heavy matters would be deposited first, afterwards the finer and lighter ones. The direction of these currents seems to have been generally uniform, extending in this country from the north and west; consequently we find the post-tertiary erratics ranging from the west and north towards the east and south, fringing the western coast up the valleys, extending into Scotland, on either side of the Pennine chain or central ridge of England, which appears in most cases to have formed a barrier to further progress, though this is occasionally surmounted in the lowest spots. The character of these deposits, and consequently the soils found upon them, present every variety of form and nature—from the blowing sands to the huge boulder stones, from the fine arenaceous to the coarse gravelly soil. Thirdly and lastly, soils are derived from alluvial deposits found occupying the line of most of the great rivers in this country. Accumulated by water in its passage through various strata, they are of a very mixed and fertile character, especially near the mouths, where the currents of salt and fresh water mingling cause the death of multitudes of infusoria, which, sinking down, are deposited along with fine mud, and affect the value of these soils to a considerable extent; similar processes may be seen going on at the mouths of many rivers at the present day. The sedimentary deposit has, in more than one instance, been turned to advantage in damming up the stream and retarding its onward progress, until all the materials gathered together during its long journey through various strata were deposited as mud, when it was allowed slowly to pass off into the sea.

"From whichever of the above sources soils are immediately derived, they are all primarily produced by the decomposition of the older rocks. Thus the granite, upreared into mountain chains and lofty hills, bare, rugged, and incultivable, is the parent of the rich soils found in the surrounding valleys; indeed all clay soils have resulted from the decomposition of granites containing felspar. Most soils are formed by the decomposition of the beds beneath, assisted by the deposit of animals and the growth and decay of vegetable matter. The principal agent is moisture, which swells out the particles, diminishing the cohesive attraction, and preparing the way for the chemical and mechanical action of the atmosphere, which gradually separates the various substances from previous affinities, and prepares, by new combinations, food for the vegetables which speedily appear. How the plant first originates is often mysterious; whether a seed may be transported by birds, or whether Nature has the power of spontaneous production, is a question which might form a subject for curious and interesting investigation, but which is quite foreign to the present paper. Yet I cannot forbear mentioning a fact which I have from good authority, as it goes some way to prove the latter hypothesis :—The shepherds of the moors in Scotland are sometimes in the habit of firing the Heather ; the ashes remain on the surface ; and, without any seed being sown, a rich herbage of Dutch Clover springs up.

"The lower forms of vegetable life first appear in new land, or, more properly, in disintegrated rock, and, by their roots clinging to and intersecting the mass, as well as by the protection afforded to the surface against the destructive effect of heavy rain, etc., materially assist in the process of forming a soil. The action of frost is also very important, the expansion of the moisture in the soil or rock breaking up the particles, and preparing the way for the chemical forces to act ; these are chiefly the oxygen of the air and carbonic acid gas, dissolved in rain water ; both possess powerful affinities for many mineral substances—oxygen forming oxides, generally more soluble and looser in nature than the original minerals ; carbonic acid acting upon lime, magnesia, and the alkalies, destroying previous combinations, and forming soluble carbonates. The character of a soil will depend upon the nature of the parent bed ; thus soils from granite consist principally of silicate of alumina, with soluble alkalies and iron, all more or less clayey in nature and destitute of lime. The soils from the chalk (especially the upper beds) contain large quantities of carbonate of lime with alkalies and iron, but very little clay, and form light, free-working soils.

"**Clays.**—These soils are very tenacious, which is due to the alumina. Plastic when moist, they are readily moulded into any form ; hence their value for the manufacture of earthenware ; and the purer and least productive soils are best adapted for this purpose. When dry, clay falls down into an impalpable dust, but in Nature clays generally bake—that is, dry on the surface, but remain moist underneath, forming masses as hard as iron, and very difficult to cultivate. The contracting influence of heat causes these soils to crack during dry weather : the fissures thus formed are often of considerable size, due to the closing of the particles kept apart by the moisture, which clay so readily absorbs. The presence of moisture, by excluding the atmosphere and the sun's rays, and by constant evaporation from the surface, causes clay soils to possess a lower temperature than any other ; they are eminently cold in a natural state. This property of absorbing and retaining moisture and gaseous matter, which may be turned to the first advantage under judicious management, often renders clay soils unfit for cultivation in a natural state. The term heavy as applied to clay soils is not in reference to their specific gravity—which is less than that of sands or calcareous soils—but in consequence of their consistency making them difficult to work. Their agricultural value varies extremely, depending principally upon the proportions of the various ingredients as affecting the physical and chemical character; and we have examples of the poorest as well as most fertile soils. Pure clay does not enter into the composition of plants, nor as far as we know (except in very minute quantities) is it decomposed into its elements; consequently a soil consisting of it only would be perfectly barren, although possessing great powers of absorption. Poor clays are the least desirable of all soils, on account of the heavy expense of cultivation—three, and more often four, horses being required for even the shallowest ploughing. Great judgment is required to know the proper time to work such land; as in wet weather the pressure of the hoof will puddle the subsoil into pans of the most impervious character. Fortunately very few are so simple in their nature as to be unfit for cultivation. More frequently the poverty is due to the saturated condition of the mass preventing the atmosphere penetrating and effecting those changes in the ingredients (thus rendered inert) which are indispensable before food can be provided for the plant. Before expending capital in reclaiming, it is highly important to ascertain whether the ingredients are of a nature to warrant it; and here we perceive an instance of the important assistance afforded by the science of chemistry, informing us, as it does with full certainty, what the soil contains, and whether it is likely to yield a fair return for our capital. Having satisfactorily settled this point, we may fearlessly proceed to invest our money, first by thorough drainage, and afterwards in pulverising, so as to admit the atmosphere, which readily takes the place of the moisture removed by our drains. Any advice as to the best methods of draining would be out of place here, and it is to be hoped, unnecessary; since landowners and intelligent occupiers are by this time firmly persuaded of the vital importance of deep drainage, and the utter absurdity of placing the drains just beneath the plough-bed, as was the practice twenty years ago. The advantages are incalculable: cultivation is lightened very often one-horse power; the temperature is raised; germination more rapid and certain; harvests accelerated ten days to a fortnight; supplies of food often apparently inexhaustible are eliminated, which would otherwise have lain dead and useless; and the number and variety of crops increased. The surface ceases to bake or puddle, hasty downfalls find ready access, and instead of standing on the surface, stagnating in the subsoil, or running off with the best parts of the soil, the rain-water quietly passes away into the drains, fertilising in its passage. It may be stated as a rule that all real clay soils resting on an impervious subsoil require drainage; without it they must be looked upon as the least remunerative; by its aid and judicious cultivation they may be rendered among the most productive.

"The practice of paring and burning the surface of stiff clays, much followed in some districts, may be noticed as bearing on the physical condition of such soils. The operation is usually performed at that period in the rotation when the land contains the most rubbish, as all surface-weeds, insects, etc., are destroyed by the fire. The process is very simple. A paring-plough, either drawn by horses or pushed by men, slices off about 2 in. of the surface, turning it over, in which state it remains till thoroughly dry. It is then got together into small heaps and burnt; afterwards the ashes are spread and ploughed in. If lime be present in any quantity, the first shower causes the ashes to fall in a coarse powder, which gets thoroughly incorporated with the soil, the lime furnishing valuable food both directly and indirectly to the succeeding crop. The effect of burnt clay is principally mechanical, opening the soil and rendering it more porous. It was formerly believed to absorb ammonia from the air, but recent experiments throw doubt upon this. The practice is found to answer exceedingly well, and, even if we do not burn the soil all over the field, we should never neglect any opportunity of obtaining burnt earth. Borders of hedgerows, and the cleanings out of ditches and corners of fields present excellent material for the purpose. The principal clay districts in this country are those of the London and plastic beds, occurring in the south-eastern counties; the Wealden, formed in parts of Surrey, Sussex, and Kent; the Lias, forming a narrow band, which runs from S.W. to N.E., right through the country from the Vale of Gloucester to Yorkshire; the clays of the Old Red Sandstone, occurring in Devonshire; and the clays of the older rocks, developed principally in Wales. Besides the above a number of smaller beds occur, as clay is found in almost every formation; indeed, very few soils are devoid of some portion. We have hitherto spoken of those soils which contain a large proportion of clay; the most fertile districts contain clay mixed with certain proportions of sand, known as clay or sandy loams. The value of such soils consists in their containing sufficient absorbing and retentive power for vegetation, at the same time being open and to some extent porous; in fact, Nature has in these cases prepared the soil and saved much of the labour necessary to the stiffer clays. When resting on a porous subsoil, clay loams do not require draining. In other cases it is only necessary to remove the superabundant moisture in order to have a soil in every way fitted for the wants of plants. Such soils turn up as a fine mould, into which the atmosphere has ready access, and the roots can throw out without impediment. Clay loams should be looked upon as the standard to which, by energy and capital, we are to bring the stiffer beds; and though in the absence of sand it is vain to hope for the permeable and mouldy character, yet it is astonishing what alterations the strongest soils are capable of under judicious management. The addition of sand to clay would be very beneficial, but the great quantity required to make any alteration unfortunately prevents this being carried out.

"**Silicious or Sandy Soils.**—This term is applied by the generality of people to all soils principally composed of silicious matter, either in the form of fine sand or of coarser sand and gravel. They possess qualities the very opposite of the last class, being light in colour, varying from a white silver sand to a rich red, and exceedingly porous. In reality heavier than clays, they appear light from the absence of all cohesiveness. They neither attract gaseous matters from the atmosphere nor retain the manures put into them; hence the poorer and purer descriptions are known as hungry soils, and are barren and unprofitable to cultivate. Not retaining moisture and being so permeable, these soils are warm; the heat, too often rendered latent by evaporation in a wet soil, is enabled to penetrate and warm every portion, rendering them peculiarly suitable for rapid germination; the seed never lies long in the ground, provided there is sufficient moisture. I have known Swedes, drilled with a solution of superphosphate, appear above ground in three days, and commonly in a week; whereas on cold soils it is usually a fortnight before they can be seen. Harvests are much forwarder for the same reason; there is often the difference of from ten days to a fortnight between sandy and clayey soils—a very important fact in our variable climate. As these soils do not retain moisture, and possess only slight capillary powers, they are subject to burn up with long-continued drought, and hence are very uncertain in their produce. In dry seasons the spring Corn is often a miserable failure, the straw about a foot long, and the yield little more than the seed sown. The root crop for the same reason can seldom be depended upon. In a moist climate, by the aid of stimulating manures, a crop is pretty certain, but in other cases vegetation is often prematurely arrested and mildew attacks the leaves, preventing further growth. Very nice management is required, exactly the reverse of that necessary for the clays; in cultivating the latter, our object is to loosen and render it as friable as possible, for which purpose we plough repeatedly, dress with long half-rotted manure, and burn the surface into ashes. On sands we plough but little, and sow the seed immediately after the plough, so as to receive the benefit of the moisture which is brought to the surface, repeatedly roll and consolidate by every means in our power, until we so force the particles together as to enable the soil to retain the moisture better. The poorer kinds of sands—those that contain from 80 to 90 per cent. of silica—are nearly as undesirable as the very poor clays. In cases, however, where it is practicable, great advantages have followed the application of marl, clay, or chalk; this has been largely carried out in parts of Norfolk, the clay and marl being even brought from considerable distances; small quantities, comparatively speaking, are found, when acted upon by frost and air, to effect an alteration in the soil; the dose, however, should not be niggardly—at least 70 to 100 yards per acre, laid on the surface as early in the winter as possible, and not ploughed in until all chances of frost are over. By such means we may in time produce a sandy loam of considerable value. Natural sandy loams are often found occupying the valleys in sandy districts; they consist of a large amount of sand with a small, but sufficient, quantity of clay, and often lime, to remedy all those defects so apparent in the purer sands; and hence such soils are amongst the most valuable known, being adapted to the growth of almost every crop. Never wet, unless resting on a retentive subsoil, they yet retain sufficient moisture to keep the roots moist; not porous, like sand, they are still sufficiently open to allow of the air circulating through and warming them; easy of cultivation, they are ploughed with two horses. The clay protects from drought; the sand causes a high temperature. In some cases the sand is replaced by coarse gravel, a large quantity of iron being present; such soils, where the proportion of clay is large, are stubborn, and, if cultivated when moist, bind together and form masses very difficult to bring to pieces. Root crops grow well, though not equal to those on the sandy loams, and, if fed off on the ground, the latter is apt to become poached during wet weather, and the crop of Barley often suffers. On the whole, we should give the preference to the sandy loams.

"**Calcareous Soils.**—This term is applied to those soils in which carbonate of lime predominates, either in a fine state of division, as in chalk soils, or as calcareous gravel, or even large irregular fragments. With few exceptions, all true calcareous soils are free from excess of moisture, light in colour, porous, and resting upon an open subsoil, derived from disintegration of a hard rock or compact chalk: often only a few inches in depth, they are liable to burn up in hot dry weather. Subsoil ploughing, by gradually deepening the surface, is very beneficial, and should not be neglected. Where a certain quantity of clay is present the soil is termed a marl, and becomes of improved quality, capable of carrying heavy crops of Wheat and Beans. On the thinner lands, Barley and root-crops answer well, provided the surface is kept sufficiently firm by sheep treading and rolling. Limestone soils possess very little cohesive attraction, and though good absorbents, are bad retainers of water. As in the case of certain sandy soils, too frequent ploughing, especially for the root crop, is very injurious; and I have seen an instance where the produce was reduced at least one-half from an extra ploughing. Calcareous soils, taken as a whole, are of a useful nature, adapted to a mixed husbandry, producing a sweet short Grass suitable for sheep, and growing most crops, especially all those of a leguminous character. The root crop requires nice management, and is rather uncertain; still, with judicious treatment and the application of artificial manures, it need seldom fail. The soils of the chalk formation, found principally in the southern and eastern counties of England, form perhaps the most considerable and collected examples of a calcareous nature. They are divided into two sorts, according as they are derived from the upper or lower beds; the former are usually poor, light, and full of flints; the latter possess more tenacity, are even marly towards the lower parts, contain no flints, and form very fertile soils. Various theories have been started to explain this difference; doubtless, to a considerable extent, it may be traced to the proportion of clay present, but also to the existence of alkalies and silica in a comminuted form, either combined as *soluble* silicates, or existing separately in such a state as to become *slowly soluble under the* action of rain-water. It has been calculated from analysis that about the same percentage of silica is diffused through the lower chalk as is found collected together as flints in the upper. To whatever due, the fertility of the lower chalk is so marked that in many instances it has been even brought from long distances at considerable expense and applied as a dressing to the soils of the upper beds. The soils upon the oolite formation form the other principal example of calcareous origin : they occur in narrow patches from Somersetshire through the central part of England, up to Yorkshire, generally forming elevated land. Resting on a porous subsoil, they seldom require drainage. The depth varies according to the situation, whether on the hills or in the valleys, and the particular bed whence derived; generally speaking shallow, but often resting on a brashy subsoil, capable of improvement by subsoiling. In the valleys occur useful soils, producing good cereal and leguminous crops ; but on the hills the soil is thin, porous, and poor, requiring different management. Seed crops must be occasional only, and the land is usually rested with Sainfoin, which remains down several years, and, being a leguminous fodder-crop, seems specially adapted for calcareous soils. Owing, however, to the variety of beds which occur in close proximity, and often come to the surface on the same farm, the nature of the land varies on the most limited areas,—a circumstance of great value to the cultivator, who can adopt his cropping to the peculiarities of each field, and thus increase the productiveness of his land. Occasional draining may become necessary, from the presence of a vein of clay between two porous beds ; but this is generally a simple operation, as we can often empty the drain into the porous rock, without any fear of the waters reappearing. There are other considerable limestone soils, such as the mountain limestone, and many smaller tracts scattered over all parts of the country. The presence of a small proportion of lime is indispensable to every fertile soil, and as the quantity required is small, it forms a most important application to all soils that are deficient in this respect; it is used either as a carbonate in the form of chalk, limestone, etc., or in the caustic state, as quicklime. The operation of lime under the latter form will be best discussed when describing the chemical peculiarities of soils.

"**Peaty or Vegetable Soils.**—Peaty or vegetable soils are those in which decayed vegetable matter, or humus, forms the principal ingredient, or at least gives distinctive character. They vary very much (according to the quantity of humus, and absence or presence of other bodies), from the rich vegetable soils of the garden to the peat bog, which is often valueless until earthy matters, as clay, sand, or lime, are added. These soils are dark in colour, light and spongy in texture, and though deficient in cohesive properties, powerful absorbents, and generally resting upon clay, require drainage before they can be cultivated. Peat also possesses a considerable retentive power itself, due to the undecayed cells of the vegetable matter, which retain and allow of the moisture rising to the surface by capillary attraction. Peat beds have in most cases resulted from the gradual decay of Mosses, etc., under water until the continued growth and decay has reached the surface, when the whole mass assumed a semi-fluid state; the peat is not, therefore, generally very deep. When practicable, it is important to lay the drain in the substratum, as affording a sounder bottom and a better material for the pipes to lie in, as well as arresting the moisture before it can rise in the peat. The physical character of peaty soils varies considerably, depending upon the amount of decay they have undergone: when first brought under cultivation they are very open and cellular in structure, becoming finer and more mould-like by exposure to the atmosphere. The deposit of peat being very partial, the soils are limited in extent, the principal tracts existing in parts of Ireland, and in Lincolnshire and Bedfordshire, forming the Great Bedford Level.

"The fineness or coarseness of granulation of soils is a mechanical character of considerable importance. Fine soils retain moisture longer than coarse ones, probably because they offer greater obstruction to its passing away, and possess a higher capillary power. By this term we refer to the power water possesses of rising in the soil, apparently in opposition to the laws of gravitation. If we take a fine tube of glass and place the bottom end in water, the water will rise in it to a considerable height, standing highest at those points where it touches the glass, as though the water possessed a certain attraction for the glass, and scrambled up by laying hold of the sides. The finer the tube the greater the capillary attraction. We must, therefore, regard the soil as consisting of a number of tubes, the walls formed by the particles of soil, and the hollow represented by the natural space between them. We must not confound this gradual rising of water with the rising of springs, as the latter results from the pressure of accumulated volume, which tends to force the water upwards till it reaches its former level. In dry seasons and climates the capillary power of a soil is often of great importance, as a steady supply of moisture is thus afforded to the roots long after the surface has become dried up. One of the great objects of draining is to prevent excessive capillarity by drawing off those waters, which would otherwise find their way to the surface in too great quantities, and lower the temperature of the soil by evaporation. Peaty soils possess considerable capillary powers; but clay surpasses all other soils in this respect. Limestone soils and coarse sands, being composed of larger materials, have little capillarity. Fine soils, being much firmer than coarse ones, present a better surface for the roots to attach themselves. The presence of considerable quantities of loose stones or flints in the latter often has a beneficial effect in rendering them more solid, preventing the roots being thrown out by frost, sheltering the young plant, and shading the ground from the drying effects of a hot sun. The custom of picking off all stones from the surface is often a great error, as they exercise a beneficial influence, and in many cases would in time disintegrate and deepen the soil. Of course they must be removed where so large as to interfere with cultivation; but the benefit is very doubtful in other cases. The presence of stones scours the plough, as it is termed—that is, keeps the share and turnfurrow clean.

"Colour may be regarded as a physical character of soils, and may be noticed as appearing to exercise a marked influence upon fertility, due in a great measure to its affecting the temperature. Pedestrians are well aware of the difference felt in a very hot sunshine in walking over a white or dark soil. In the first case the rays are reflected, and strike upon the body with uncomfortable force; in the second they are absorbed, and the ground, or rather air, appears cool and refreshing. The darker a soil, the greater its absorbing power; but, to compensate in some measure for this, the light-coloured soil retains heat longest.

"**Lime.**—Lime is very abundant in Nature, being found in all fertile soils: indeed, as it enters into the composition of every kind of plant, we may safely conclude that it is necessary to vegetation. It is an oxide of the metal calcium, possessing basic properties, having a great affinity for moisture and carbonic acid; on exposure to the atmosphere it rapidly becomes a hydrate, and finally carbonate of lime, in which state it principally exists in soils, though it is also found as sulphate and phosphate. From the earliest times lime, either as carbonate or oxide, has formed an important dressing for all kinds of land: whenever new land is brought into cultivation, or old pasture broken up, quicklime should be applied, whether the soil be stiff clay or light sand. We are better acquainted with the action of quicklime than of the carbonate, owing to its having engaged more attention from the chemist; but it is reasonable to suppose that the action is similar in both cases, only much more rapid and effective in the former, and therefore its application is to be preferred. As much less is required, the expense of burning is compensated by the saving in labour. Much difference of opinion still exists as to the action of lime; some chemists would limit its effects to vegetable matter only, others confine its action to the decomposition of mineral matters, while a third class look upon it principally as a manuring substance. We believe its value is due to all three causes. That lime has a most beneficial effect on inert vegetable matter is clear, from the advantages which follow its application to peaty soils; that inert vegetable matter exists in soils that have been long in cultivation and frequently manured is most certain; and that lime would in such cases prove as fertilising as a dressing of manure seems reasonable to conclude; but of course, as its effect is destructive, and in this sense dependent upon the presence of vegetable matter, it can never be substituted for manure. Its action consists in reducing to an available form those substances which have not been already absorbed by plants on account of their insoluble condition. This, it is now generally believed, is effected by the gradual reduction of the humus into its ultimate products, carbonic acid and water, and possibly ammonia or nitric acid; the nitrogen of the atmosphere uniting with the hydrogen set free in its nascent state

During this process it is probable that various organic acids are formed; passing rapidly one into another, without entering into plants as such. Lime removes the acidity often found in vegetable soils, either by destroying the acid, or combining with it to form an organic salt. Were the action of lime restricted to vegetable matter only, it could not fail to prove a most valuable application; but its relation to the mineral matters in the soil is perhaps more important still. In most stiff soils the alkalies are found united with silica and alumina in certain proportions, mostly insoluble, and therefore useless. Rain-water, containing acid, might gradually dissolve out portions sufficient for a natural condition, but inadequate to the artificial requirements of cultivation. Lime appears to possess the power of setting free the alkalies and magnesia from their insoluble condition, probably replacing them; and, what seems rather extraordinary is, that when these substances are added to the soil and would pass away too rapidly and be lost, by some means not yet clearly understood lime possesses the property of fixing them as insoluble compounds, causing their union with those very substances from which it had previously displaced them. Any attempt at explanation of these remarkable changes would be out of place here; but should the present discoveries be confirmed by further investigation, a most important fact must follow—viz., the advantage of repeated applications of small quantities of lime, and the wastefulness of the old system of heavy dressings. Lime enters into the composition of most crops, but the quantity required for this purpose is so small, and the natural supply in most soils so abundant, that we can hardly attribute the effects of its application to this cause. From all these facts, we should expect to find limestone soils a very fertile class, and when the other essential elements of fertility are present, such is the case. We are not certain that lime as carbonate acts in the same manner as in the caustic state; that its application to soils light and heavy, mineral and peaty, has been found beneficial is undoubted. Its influence may partly be ascribed to physical causes, making stiff clays more workable, sands more absorbent, and giving firmness to peaty soils.

"**Iron.**—This is an important ingredient of soils, and is found in most crops. It generally exists as peroxide, giving a red appearance. The protoxide appears to exert an injurious influence on vegetation; it is found in the subsoils of stiff undrained clays, giving the yellow tinge. On exposure to the atmosphere it absorbs oxygen, becoming peroxide. When such subsoils have been brought to the surface too suddenly, great injury has resulted,—which is generally attributed to the protoxide of iron.

"**Effect of Depth of Soil on Vegetation.**—The deeper a soil is, or can be made by good tillage, provided it contains the elements of fertility, the more productive it must become, not only by causing a large supply of actual food, but also by presenting an *increased surface* for the action of chemical forces to retain those *valuable substances, which* being in solution would otherwise pass away in the subsoil, where, though they might be retained, the roots could not get at them. The atmosphere penetrates more freely, warming and exciting the whole mass; the roots, instead of merely throwing out laterally, and creeping along just beneath the surface, as in shallow soils, push boldly out in all directions in search of food, and thus strengthen the plant. It is our belief that the Wheat crop requires a deeper soil than is generally thought necessary, and that root-fall is often due to the lateral direction into which the roots are forced by the impassable pan a few inches beneath the surface; at the same time the surface should be made as firm as possible, for there is no doubt that the Wheat crop likes a firm, though not a shallow bed. How often we see cases of surface-rooted trees, such as Lime or Beech, being blown up by the wind, roots and all, while the deep-rooted Oak stands firm! The great use of the modern cultivators, so generally employed in fallowing operations, is to stir and lighten up those portions which, too deep to be reached by the plough, are yet pressed down by its weight passing over them. The alluvial tracts so frequently found surrounding our principal rivers, are all deep and very fertile; though generally dry, they never suffer from drought, owing to their powers of absorption, both from the air and subsoil. Depth being so important, we should do all in our power to increase it by artificial means when required; as frequent ploughing at a uniform depth produces even in the deepest soils a hard bed, through which neither roots, air, nor moisture can readily penetrate, the use of the subsoil plough, once in each rotation, generally after the first ploughing of the stubbles for the fallow crop, is strongly recommended. Where the subsoil consists of a stiff yellow clay, care must be taken not to bring up too much at once; for else, being of a poisonous nature, it would injure the land for some time—until, in fact, the oxygen of the air had effected the necessary chemical changes, and sweetened the mass. Deep soils are much less injured by sudden changes of weather than shallow ones, for being open and friable, the rainfall passes slowly through them, and after nourishing vegetation disappears in the subsoils; and during a dry time they maintain their moisture, owing to their powers of absorption and capillary attraction. Many of the most fertile loams, resting upon a gravelly and very porous subsoil, owe their fertility to depth. The same rule holds good with soils resting on chalk or limestone: they are rich or poor according to depth. Therefore it is evident that in farming, besides the mere routine of preparing the ground for the crop, we have the important business of deepening the soil to attend to. Draining, in all cases where the land requires it, will be found a most important assistant, lowering the water-level to the bottom of the drains, some 3 ft. or 4 ft. from the surface, enabling the atmosphere, that great fertiliser, to penetrate into the crevices formerly filled with moisture, and by diminishing the tenacity, lessen the difficulties of deep cultivation.

"In cases where porous soils rest upon stiff subsoils, occasional subsoiling, by bringing to the surface much valuable matter, which had passed through, will be found equal to a dressing of manure. In the case of clay soils, we are often enabled by deep cultivation to ensure a supply of those mineral substances so essential to vegetation, but which are naturally in an insoluble state, requiring the action of the air and rain-water to reduce them to an available condition for the wants of plants. The only caution required, as was before mentioned, is to avoid bringing up more of the sour subsoil at a time than the winter's frost and rains can fertilise, and always to plough deepest in autumn for the fallow crop; for the frequent stirrings and mixings which the soil receives for the fallow, whether bare or green, will tend to fertilise, and prevent any injurious effects which might otherwise follow. The way in which the stubbles are managed on a clay farm is a good criterion of the ignorance and poverty, or the intelligence and capital, of the occupier; if horses be short, they are left untouched till spring, and all the benefits of winter frost, etc., lost; indeed, I have met with men who professed to agree with such a system, and argued against the autumn ploughing, as being injurious to the land. It is possible that, in a peculiarly wet season, we should do more harm than good by attempting to plough; but such cases will be found very rare, and the intelligent man who understands the value of his winter ploughing, will generally find his opportunity. Then, again, the slovenly manner in which the work is often hurried over, 'because it is only the stubbles and does not matter,' is a proof of the ignorance of principles which exists among so many so-called practical men. The autumn ploughing of stubbles for the fallow crop is the most important operation of the whole rotation, and the succeeding crops will greatly depend upon the way in which it is done. We should aim at quality rather than quantity, ploughing as deep as the soil will allow, without bringing up above an inch or two of the subsoil; holding small furrows and laying them up at a considerable angle, so that rain will not remain long on the surface; laying out the field into convenient-sized lands, higher or lower, larger or smaller, according to the tenacity of the soil; carefully crumbing out the furrows, and making proper grips to carry off the excess of water consequent on heavy winter rains. By such means we insure the soil receiving all the benefits which the changes of weather can produce; the atmosphere will penetrate, because we have taken precautions to allow of the moisture getting away; the soil must become pulverized, and will be ready to work in the spring much sooner than land untouched, which, lying flatter and with no surface drainage, will most likely have remained saturated with moisture all winter, and will turn up raw and stubborn, at the very time that the autumn-ploughed may be ready to receive a crop. The practice of deep ploughing is happily on the increase, and its importance seems now generally recognised by all the best farmers, yet it is lamentable to see with what fatal attachment a large class still adhere to old customs and prejudices. The practice of Mr. Smith, of Lois Weedon, though not of a nature to be followed on the large scale, has been of extreme value in pointing out the immense advantage of deep cultivation on all soils containing any considerable quantity of clay. It seems only extraordinary that, in these days of cheap publications and railway communication, it should be necessary to point out and reiterate facts which appear so self-evident to every candid observer. Depth of soil ought to be one of the desiderata of the farmer; and yet, with the means so frequently in his own hands, he ridicules the idea of making use of them."

## Walks.

There exists at present great controversy of opinion with regard to the necessity or otherwise of walks in kitchen gardens. It has of course, for centuries, been the custom to lay out gardens with walks, dividing them into squares, these being subdivided by alleys, and so forth; it is therefore hard to get out of that plan, and where walks already exist probably few people will care to wholly eradicate them from the garden; but where new gardens are being formed, the matter of walks is perhaps worth consideration. A great deal, however, depends upon the purpose for which the garden is intended. If fruit, vegetable, and flower garden be combined, as is often the case, walks are indispensable; but where each department is separate, walks may not be necessary in the vegetable or fruit garden, unless in a private establishment where the proprietor or his friends take as much delight to walk in these departments as in those of the more ornamental order. There have appeared many articles in "*The Garden*" upon this subject; we therefore reprint extracts from them, and leave our readers to decide whether they will have walks or not.

One writer advises no walks for the following reasons:—

"1. *Convenience of Watering and Irrigation.*—Even in our moist country good vegetable culture is not everywhere possible without thorough watering or irrigation, and this cannot be conveniently done without spoiling all the walks, gravel, edgings, etc. A week of warm weather in July shows its effects on the supplies of vegetables—at a time, too, when they are most sought after. It cannot be said that our vegetable gardens are what they should be so long as we are unable to reap benefit instead of loss from the sunny weather. For in a garden properly irrigated, a few weeks of warmth would simply give us a better result than we should obtain during a similar number of cold or clouded days.

"2. *To Secure Good Culture.*—To get the fullest result from a given piece of ground devoted to vegetable culture, it is necessary that the whole of it be thoroughly turned up, and well enriched from time to time. Where walks exist this cannot be done with ease and thoroughness. The whole surface of a kitchen garden should be as much open to the labours of man, or horse, or spade, as a heap of loam lying in a compost yard. In the orthodox kitchen garden, the men may frequently be seen carefully scraping their boots lest anything should get on the walks, just as if they were going into a drawing-room. Half the ground thoroughly cultivated would be better than the large areas we frequently see bare in many places or poorly cultivated. As regards the convenience of moving composts, etc., that is more easily secured in a garden free from all obstructions in the way of well-gravelled walks and neatly-kept edgings. In the case of a very large garden, a firm cartway might in some cases be desirable; but the fact is that the space really necessary for the kitchen garden proper, under a good system of culture, is of a size that such a convenience leading to it is all that is required.

"3. *Because Walks are Needless as a Convenience among Kitchen Garden Crops.*—Permanent walks may, to some, be a convenience among choice dwarf fruit trees, small fruits, plantations of herbs, etc., but nobody who considers the matter fully will say that they are needed among succulent crops, such as Cauliflowers, Kidney Beans, and the like. A walk in itself is ugly, and a few lines of a useful well-grown crop are far preferable from the point of view of appearance; as to inconvenience from mud, etc., there is literally none, because in any case the cultivator or gatherer has to get on the ground, and in the usual style of elaborately laid-out gardens he has always the needless trouble of taking care not to dirty the walks. In a well-drained garden there is little fear of mud. In case one of the main lines of walks pass through a kitchen garden, we need not consider it, because that is a question concerning the general convenience of the place. It has nothing to do with the present question—the need of walks in the kitchen garden itself.

"4. *Cleanliness and Neatness.*—It is much easier to keep a garden clean, the whole surface of which is devoted to crops, than one where a large area is bare, and continually offering in edgings and in gravelled surfaces sunny welcome to the seeds of weeds. Under a better system, all the trouble of cleaning the walks, and keeping edgings, etc., in order, would be saved. As to appearance, there is nothing nearly so beautiful in the ordinary kitchen garden as may be seen in a garden where the whole surface throughout the growing season is covered with healthy growing vegetation.

"5. *Because Modern Wants are Different.*—The kitchen garden is now planned as it used to be, when many of the flowers, fruits, etc., were all grown within its walls; and in those days there was absolute need of walks in the kitchen garden, from the season of the Golden Crocus to that of the Christmas Rose. But we have changed all that. There has long been a desire to separate fruit gardening from kitchen gardening: the wisdom of this view there is no room to discuss here, but there can be no doubt that in most gardens flowers—hardy as well as tender—have left the kitchen garden for good.

"6. *Economy.*—In many kitchen gardens there is quite a mile of broad, gravelled walks, mainly for the convenience of those who have to perform the pretty frequent labour of cleaning them and the edgings, etc. Space may not be very precious in the places spoken of, but it is none the less true that the ground often wasted in walks would be sufficient to grow vegetables for a family. It is obvious that a market gardener who tried to do his work in aparadise of walks would soon be heard of in the Bankruptcy Court. Market gardeners, like other men, sometimes err, but none of them are simple enough to go to work in this manner. Let it not be thought, however, that their gardens are always untidy because of the absence of walks. In most counties, the better class of market gardens are models which the private gardeners might well study, even from the point of view of neatness and appearance."

A writer in favour of walks observes :—

"If the kitchen garden attached to a private establishment be looked at from a strictly utilitarian point of view, where the only aim is profit, why, then it is questionable whether it is advisable to go to the expense of walks. But in large establishments, where the kitchen garden extends to many acres, it is an absolute necessity to have some walks gravelled, for taking in manure and bringing out the produce. A kitchen garden may be all very well without paths on exceptionally dry, sandy soil; but in most places the alleys through the winter would be little better than cattle-tracks to a drinking pond. A well-made roadway, for whatever purpose it may be required, is certainly not a waste of money, as is said by those who advocate no gravel-walks in a kitchen garden. Asphalte or concrete walks are out of the question, as, except in few instances, these are not likely to be employed in sufficient numbers to affect the argument one way or the other. Properly constructed gravel-walks, proportionate in extent to the size of the garden, are necessary not merely for appearance sake, but for use and convenience. There are many employers who enjoy a stroll through a well-managed kitchen garden; but if reduced to nothing more than a cultivated field for vegetable crops, however high the standard of management in it may be, it will be seldom visited. There are proprietors to be met with who prefer to grow their vegetables in the same way as is practised in market-gardens, and against this there is nothing to say; but to advocate the general adoption of such practice in private establishments is a very different affair, and a course not likely to become general. Whilst advocating the claims of walks in a kitchen garden, I maintain no more should be introduced than is necessary for utility and convenience, to get about each part with some degree of comfort in all weathers. More walks than there is occasion for are at all times objectionable, but to dispense with them altogether in new gardens that are being made is going to extremes. There is no reason why walks should be so made as to have a prim appearance; all that is required is to have them dry and serviceable. The question of walks also settles that of edgings. If you have the former you require the latter, or how is the soil to be kept off the walks either when hoeing or when the rain washes it off? Box-edging is objectionable in many ways, however well it looks; and all living edgings require a good deal of labour to keep them in proper condition. They harbour slugs; and salt when required cannot be used either to the soil or to destroy weeds on the walks. There are several kinds of tiles that will stand the weather; but where a cheap, durable, yet efficient edging is required, nothing answers better than well-burnt, common bricks set on end, left about 1½ in. above the soil of the border. They are easily laid, and very readily put straight in line if a little displacement should by any means occur.

**Construction of Walks.**—Where walks are desired at all, they should be made in strict accordance with the size and style of the garden. For example, a large garden and a lot of narrow walks are objectionable; and wide walks in a small garden are unsightly as well as extravagant. A few walks of sufficient width to allow of two persons walking together side by side will be preferable to narrower ones. The principal point, however, to settle, is not altogether the width, but quantity of walks. A kitchen garden with a walk all round, and one across each way, thus dividing the ground into four quarters, will in the majority of cases be found all that is required; but in very large gardens more may possibly be necessary.

It need hardly be said that the best material for making walks is gravel, or at least it is the best thing likely to be used. Asphalte, flag-stones, pebble paving, and all that sort of thing is out of the question—indeed, it is doubtful whether good gravel is not in the end superior even to these. The best kind of gravel is that of a reddish-yellow colour; and it should be of a binding nature, otherwise the surface is always uneven and causes far more trouble to keep in order than walks made of good firm binding gravel. Amongst other things for walks, when gravel cannot be readily obtained, may be mentioned coal-ashes, sea-gravel or sea-shell, road-sand, chalk, and cinders from the iron foundry broken small, as being very good material when properly laid. Whatever material is employed, it is necessary that walks be well drained—which can be effectually done by excavating the earth to a depth of two or three feet, or in fact until a hard dry bottom is reached. This should then be well loosened up with the pickaxe. The trench thus taken out should then be filled with large stones, brickbats, garden clinkers, or any such material, to within 12 in. of the final height of the walk. On this should be laid 6 in. of coarse gravel, on this 4 in. of finer gravel, and the other 2 in. should consist of finely sifted gravel or coarse sand.

Gravel should always, if possible, be laid down either early in the autumn, before frosty weather sets in, or early in the spring, when such dangers are past. Newly-laid gravel when subjected to severe frosts has anything but a satisfactory appearance, and will not bear walking upon without clinging to the feet. Therefore the aim should be to get such work done in time to allow of the gravel getting thoroughly and firmly settled before frost sets in, or delay it until after it has passed. The autumn is, however, the best time to perform this operation, inasmuch as the walks have a winter's rain upon them, and are consequently more likely to get firm and settled than if made in the spring, after the rainy season is past. The top coat of gravel should be laid on as soon as dug from the pit, if possible, as it has then a tendency to bind more quickly than when exposed to the air for a length of time previous to being used. Many people add water to the gravel until it has the consistency of mortar, and no doubt this is good practice when time can be spared for so doing; but it not only takes a long time to mix in this manner, but gravel thus treated cannot be laid nearly so quickly as when put on in a comparatively dry state. It is, however, a good plan, after the walks are finished and about to be rolled, to have some one go behind the roller with a watering-pot and a rose, and keep the roller wet. By this means a walk, if thoroughly rolled, will be made firm and fit for traffic in a few hours. Where walks have a steep slope it is necessary to have small gratings placed at the sides, at short distances apart, in order that the water during heavy rains may be readily carried off without washing the gravel into heaps, as would otherwise be the case. When gratings are to be used the best plan is, when making the walks, to place glazed or common drain-pipes in an upright position, wherever the gratings are required to be; and if the top of these be within a few inches of the level of the walk, and the bottoms rested on rough bricks or stones, the water may be carried into the drainage below by placing the gratings directly over the pipes.

When road-sand or ashes are used, they are best put down in a wet state, and in the case of road sand a hard walk will soon be made if it be well rolled. Ashes, however, do not bind so quickly; but they form a good dry walk, and are easily kept clear of weeds, and may be renewed when required with little labour. A well-made walk should never have a flat surface, but be rather higher in the middle than at the sides, for two reasons—one because the water would not readily run off, and the other because, the principal traffic being along the centre, that part would soon become lower than the sides, and thus look unsightly, as well as hold the water. It is therefore obvious that walks should at all times be made highest in the middle, sloping each side smoothly and evenly; they should not, however, be made so rounding as to be uncomfortable to walk upon, as is often the case, but just enough to be seen by the eye and not felt by the feet. Walks should in all cases be an inch or two higher than the surrounding ground, to prevent the soil from being washed into them by the rain.

## Water.

This is a subject to which more than ordinary attention should be paid, inasmuch as in many districts kitchen-garden crops suffer considerably from drought during the dry summers. Therefore in choosing a site for a new garden the means by which it is to be watered during dry weather must not be overlooked. In some parts artificial watering is seldom resorted to, nor is it needed; and in naturally dry localities deep cultivation affords in some measure a substitute for the watering-pot. Unfortunately, however, deep soils do not everywhere exist; and in such cases arrangements should be made for supplying water in some practical manner. Where there is a running stream, as sometimes happens, advantage should be taken of it to irrigate the garden; but where this is impracticable, from the low situation of the water, recourse must be had to pumping or carrying. Where, however, there is no stream or other convenient way of obtaining water, a well must be sunk, and to do this in some parts of the country is no easy matter. A little expense, however, must not be thought of if a good and productive garden be the object in view. After the well has been sunk, a pump will be needed to throw the water from the well into a tank placed some few feet above the level of the highest part of the ground. If a main pipe be then laid from this tank down the centre of the garden, branch pipes or wooden troughs may be laid from it to conduct the water into tanks distributed about the garden; or, better still, means may be provided for watering with a hose. This is the best and easiest way of watering, and in some cases even better than irrigation, as in the latter case all the crops have to be watered, whether water is necessary or not, whereas by the former method any part can be watered separately, and the plants sprinkled overhead—an operation that is in many cases more beneficial to vegetation than root watering. Whenever water is given to any kind of crop, it should always be of a temperature if possible within a few degrees of that of the soil to which it is to be applied; for it is a well-known fact that to water any crops in summer with very cold water is injurious rather than beneficial to them. Any tank or reservoir for the retention of water should, therefore, be placed in such a situation as will expose the water as much as possible to the influence of the sun, and if kept constantly full, the difference between the temperature of the water and that of the soil during the summer will be but slight. One remark of some importance with regard to watering crops, is that it should be done thoroughly; surface-watering only serves to keep the roots near the top, where, if allowed to get dry—which they soon do if watering be neglected for a time—they become scorched by the hot sun, and the evil effects of such treatment soon become visible. Deep culture and thorough watering are two of the principal essentials to the successful growth of all vegetable crops, and therefore both should receive more attention than they now do in the majority of places.

## Trenching, Digging, and Draining.

Trenching is a most important operation, and ought to be done well and wisely. A man with a strong arm can cast out a trench well, but it requires both judgment and experience to decide how much, or if any, of the subsoil should be placed upon the top. Subsoils vary so much that no certain rule or correct guide can be laid down upon this point. But there is one operation that is applicable to every variety of subsoils (which, neglected, no trenching can be said to be efficiently carried out)—that is, loosening and breaking up the bottom of the trench by spade or mattock, as the case may be. The more thoroughly that is done, the greater will be the ultimate benefit resulting therefrom. Another very important point to be considered is the proper season in which to trench. No doubt autumn is the best time for such work, and the earlier in the autumn it is done the better, before the surface-soil parts with its heat.

The next consideration of importance is the application of manure during the operation of trenching. Many people never trench in manure, whilst on the other hand some think it best. If manure be deeply buried in the trench, it is well to use it in a green state, thus giving the ground the full benefit. If trenching be done in the autumn the manure will, by the following summer, be decomposed; and should the weather be dry, deep-rooting plants will soon go in search of it and be greatly benefited thereby.

There are, however, people who prefer putting the manure near the surface, with a view to benefit the soil underneath by the washings of the manure by rains. This question must, however, be settled individually, according to opinion or circumstances. The proper depth to trench must depend upon the natural depth and character of the soil, and also the depth that has been gone to in previous trenchings. If the subsoil be bad, no portion of it should be brought to the surface, but a few inches of it may with advantage be stirred and left there for a time; and the essence of the manure washed down by rains becomes mixed with and gradually improves it by the time the land again requires trenching. In two or three years those few inches of bottom soil can be brought to the top, and a little more of the bottom loosened up and left as before. Where the subsoil is ordinary clay, a couple of inches at this and every subsequent time the land is trenched may with advantage be brought to the top; but, where this is done, the work should be carried out in the autumn or early winter, so as to allow of the clay getting mellow, and in a fit state to be forked in previous to the time of cropping.

In digging or trenching in autumn and winter, the ground can be scarcely thrown up too roughly. As large a surface as possible should be exposed to the action of the atmosphere; no time should be wasted in attempting to chop and cut it to pieces, as the weather will do that better than any workman can, however careful he may be. The great point is to work the soil up deeply and roughly, and then in frosty weather, if possible, to take a pick and loosen up the frozen crust and let in the air still deeper. On no account should snow be turned into the ground, nor frozen soil be deeply buried; as, when thus turned down, it is a long time before it thaws; and consequently remains wet and sodden. As spring comes round we can no longer count upon frost as an ameliorator of the soil; therefore, in all digging which it may be necessary then to do, the soil must be thoroughly broken up with the spade, especially where land is constantly under crops. In some soils, too, dug deeply after

February, there is often a difficulty in securing the necessary firmness. If too much air be let into soils that are naturally porous, plants may suffer from drought, even though the season may not be dry. In short, though digging is a simple operation, yet very much depends upon its being done at a right time as well as in a right manner, and the right time depends in a great measure upon the character of the soil and subsoil, and upon the nature of the succeeding crop.

In digging, a deep and wide opening is necessary, so that the newly turned earth and dung thrown well up against the opposite ridge may mix together in rolling down the face of the trench. In heavy soils a steel fork will be found an excellent cultivator. Indeed, it has entirely superseded the spade for spring "pointing"; it pulverizes and disintegrates heavy moist soils in a more efficient manner than can be effected by any other garden tool; and as agriculturists have made such rapid strides in machinery for cultivating the soil, there is no reason that horticulturists should not invent something to ease manual labour and work the ground more perfectly.

**Draining** is a matter that in some cases requires more than ordinary attention. Where heavy wet soils exist, effectual trenching is at any time indispensable to the production of good vegetables; but especially is this the case where early vegetables are required—the latter in the majority of cases giving the most satisfactory results when grown in a light, well-drained, and consequently dry soil.* The object of draining is to get rid of superfluous water, thereby rendering the soil drier and more absorbent of the sun's heat, more friable and open in texture for the admission of air and rain, which prevent the generation of deleterious acids, more accessible to the tender permeating rootlets of the crop, and likewise more easy and certain of cultivation. Before excavating the drains, it is always worth inquiring whether the wet is retained in the surface soil by an impermeable underlying "pan," which, if broken up by the subsoil plough, would be sufficient to let off the superfluous moisture through the underlying beds; or whether the thin clayey soil would not require all the moisture if it were cut up and deepened by sandy admixture. Again, in some very level tracts where sufficient fall is difficult to be obtained, it is also worth trying the nature of the subjacent beds, to see whether they might be porous enough to receive and carry off the discharge of the drains. Under some morasses there have been found beds of open quartzose sand, which, when dug down to, were sufficient to carry off all the drainage water; and in the chalk districts it is not unusual to find below a sufficient outlet for the drainage of the superincumbent heavy clays and loams. This property of taking away surface-water is possessed by all rocks having sufficient porosity, and especially by sands and gravels, chalks and limestones, absorbent sandstones and fissured trap-rocks. As draining, when thoroughly executed, should be viewed as a permanent improvement, every precaution should be taken to ascertain the nature of the soil and subsoil to be operated upon, to fix upon proper depths, so as at once to deepen the soil and not to carry off the dissolved manures, to see whether there be surface stones procurable for the filling of the drains, or whether these might be rendered more efficient by covering the tile-pipes with stones which have otherwise to be got rid of. The sole object of drainage is to render soils at once more easy of cultivation and more certain and abundant in their productiveness. The exact depth of the drainage is a subject that has long received the attention of many connected with land cultivation on both farm and garden. Various depths have found advocates, from 2 ft. 6 in. up to 6 ft.; for most soils a medium depth will be found most practical. But any uniform depth of drainage for soils of the different descriptions cannot well be fixed upon. For all practical purposes, it will be sufficient to say that the bottom of any drain should be something like 9 in. below the stratum that holds water; and, for a garden, something more is required than the simple pipe-drain alone, inasmuch as roots of the fruit trees and deep-rooting vegetable crops are subject to get down into the pipes and choke them. This is a matter that should be guarded against. After the pipes are laid, 6 in. of brick rubbish or broken stones should be laid on the top; which will in a great measure prevent the danger of root-choking, for, even if the pipes were filled up with roots, the material above would act as a drain.

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* "*Economic Geology*," by David Page, F.G.S. Blackwood & Sons.

**Trenching in Market Gardens.**—From November the 1st till the end of January every empty piece of ground that can be spared uncropped for more than three weeks is trenched, more particularly if it has not been done the previous season. Even the ground amongst fruit trees is trenched and manured. Trenching orchard-tree ground may seem undesirable, on account of possible damage to the roots; but it is nevertheless extensively carried out in the neighbourhood of Barnes, Putney, and Chiswick, as any traveller that way can see. Mr. Dancer, of Chiswick, a very reliable authority as regards fruits, states that digging, and even trenching, amongst fruit trees contributes immensely to their benefit, provided it is annually performed and plenty of manure added. The vegetable crops, too, that are grown between the trees require deep working and enriching of the soil. Indeed, to this Mr. Dancer attributes the flourishing condition of his trees and the fine fruit that they produce. Trenching is considered of the first importance in the case of ground about to be cropped with early vegetables, such as Cauliflowers and Lettuces, and also for root crops, such as Parsnips, Beet, and Carrots. If the future crop is to consist of Vegetable Marrows, or any of the Cabbage tribe, the ground is heavily manured when it is trenched, the manure being spread on the surface of the soil, which is already strewed with decaying vegetable refuse, but Cabbage stumps or live roots are always removed. The field or plot of ground is then measured off into 2-ft. widths, being the width of the trenches. The latter are made two, or, at most, three spades deep, and are laid up in the form of rough ridges—a condition in which they remain till planting or sowing time. In trenching, the men are placed about four paces apart, and each works till he meets his neighbour. When one trench is finished, the manure and surface of the adjoining one is cast into the bottom of it, and it is then laid up in a ridge, just as in the case of the other, and thus the work goes on until it is finished. If Parsnips, Carrots, Beet, Salsafy, Scorzonera, or other deep-rooting crops are to occupy the ground, it is not manured at trenching time, as the application of fresh manure would produce forked roots, which are much less valuable than such as are straight. It is, however, indispensable that the ground should have had a good manuring for the previous year's crop. At planting time the ridges are commonly levelled a little, by means of the hoe, spade, or plough; but, in some instances, crops of Cauliflowers or Cabbages are planted low down on the sides of the ridges, which afford them protection from winds until they have fairly begun to grow. The ridges are then reduced in height by hoeing.

## Manures.

It is a much easier task to define the constituent elements of manures than it is to lay down any rule for their application. Science can do the one; but to apply manures beneficially, it is requisite that we should, in addition to scientific knowledge, possess an experimental acquaintance with soils of different kinds. There are now many kinds of artificial manures advertised as being the best; most of these, however, are far too expensive for general garden or farm use,—expensive because they only act as a stimulus for the time being, and require to be constantly used to produce anything like satisfactory results. The best manure of all is undoubtedly that from the farmyard, applied in a well-decomposed state. If land be tolerably rich, and receive a good dressing of stable manure once in two or three years, vegetables of better quality will probably be produced than by manuring each year in succession. There exists, however, great diversity of opinion with respect to what degree of decomposition the manure from the yard should reach before it is used. Whilst some are of opinion that it cannot well be too much decayed, others think it more beneficial to the land when used in a greener state. Let this be as it may; advocates of both measures point triumphantly to results as conclusive evidence that they are right. It is not to be denied, of course, that a marked effect will follow either course alluded to, especially if sufficient manure be applied; and yet both of these plans are wrong, though partly right. It is quite true that manure is not food for the plant until it is decomposed or "rotted." But the fatal objection to rotting in the yard is that, by so doing, we lose, say one-half, of a *valuable commodity.* On the other hand, by using green manure all the constituent elements are put on the land; yet the bulk is not increased nor the quality improved; it seeds the land with weeds, and does not save time or labour, and may cut the ground up objectionably. The following process, however, will probably meet all objections. On the ground where it is desired to have the manure, select an elevated position, and with the aid of the plough and shovel make a long, shallow trench, 6 in. or 7 in. deep and 2 ft. or 3 ft. wide; throw the earth out on the upper side of the trench. Next, in cleaning the stables, always shovel immediately into the cart or waggon and haul at once to the trench, where it may be dropped in a manner most convenient for covering. Then cover the manure as soon as possible with earth taken from either side of the trench, until the manure is covered with twice its bulk of earth. The drier the earth and the more pulverized, the better. Let the earth cover all the manure as effectually as possible, to arrest the gases arising from the decaying manure. In this state it may stand as long as desired without loss, if the weeds be not allowed to grow on top of it. A month before using, it should be examined, and if not thoroughly rotted, the heap should be lightened up and stirred, to admit air and moisture. When ready for use, the manure has almost disappeared, and the earth having absorbed all the gases evolved in the act of decomposition, has become manure. But inasmuch as we doubled the bulk of earth to the manure, we have virtually twice as much manure as we had. The main principle of this process is the well-known quality which earth possesses of "fixing" or holding and retaining gases—a quality now applied beneficially in earth-closets, etc. The earth retains these gases, which are the vital fertilising properties, until the plant root comes in contact with it. This fertilising earth is very durable, as "nothing is lost": indeed, its effects have been plainly visible on spots of ground where it had been spread twenty years before. By this process every possible objection in the treatment of manure is obviated, every leak stopped, and every advantage gained. When the compost is thoroughly rotted, the weed seeds must be killed, and the manure is fit for any or all crops. For ploughing under and top-dressing we have the trustworthy authority of Professor Johnston for saying that when a compost is made of more than one constituent, the mass is equal or superior to its best part. From this it would follow that the whole of the compost heap is at least as good as the best ingredient which came out of the stable, and that the quality of the whole is improved.

Since the introduction of the patent earth-closets, the manure from these has in many places been used with satisfactory results. This kind of manure should, however, be used with caution, inasmuch as it is very powerful, and crops may easily be injured by its being applied too liberally. It should not be used in a fresh or green state, but be mixed with other soil, and allowed to remain at least for several months, to become somewhat decayed.

Manure from the streets of London and other large towns was at one time highly valued by market gardeners; but London at the present time furnishes very little valuable scavenge. The various Health and Towns' Improvement Acts during the last thirty years have led to vast changes, and our leading thoroughfares at least are better looked after. Since the advent of the asphalte pavement, horse and cattle "droppings" in the City are specially attended to. We can, however, picture to ourselves what the streets of London were a hundred years ago. Miller, in his "Gardeners' Dictionary," writes—"There is not any sort of manure equal to the cleansing of London streets for all stubborn clayey soils, which will be better separated and in much less time with this manure than any compost whatever; and it is extremely well worth procuring for grass or garden land." The ashes and soot of pit coal were also recommended for their special qualities, which they are still credited with, and possess to a certain degree, according to the circumstances of their use.

**Bones.**—These have long and deservedly been held in high esteem as a suitable manure for every kind of garden crop. The fertilizing properties of bones were known to many old gardeners who knew little or nothing of scientific analyses; for they have been found buried whole below fruit trees in some of the oldest gardens in the country. Bones consist chiefly of phosphate and carbonate of lime with other kindred elements, and they are also rich in ammonia, making them especially well adapted as a manure for permanent fruit borders. Being slow to decompose, they retain their fertilizing qualities for years. For most purposes bones are best when reduced to a small state; and this may be easily done by the following method. "If you have ground bones, make them up into a compact heap with twice their bulk of coal-ashes, muck, sawdust, loam, or even sand; moisten the whole thoroughly with water, and cover the heap with a few inches of earth. In warm weather the bones will begin to heat in a few days, and usually in a week or two the bones will be reduced to a mouldy mass, that they may be rubbed to powder in the hand. The exterior of the heap, for a few inches of depth, may not ferment as thoroughly. If needful, the heap may be opened, turned, moistened again, and set into a second fermentation. The larger the heap, the finer the bone, and the warmer the weather, the more rapidly will the fermentation go on. The above process will not only reduce coarsely-crushed bones to a state suitable for distribution, but is an excellent way to treat bone-dust just before application, rendering it more active. With coarser bones more time will be needful, while opening the top of the heap at various points and pouring in stale urine or dungheap liquor will expedite the process. The Russian method of reducing entire bones with potash, or, what amounts to the same thing, with wood-ashes and lime, is as follows:—To 4,000 lbs. of bone take 4,000 lbs. of wood-ashes, 600 lbs. of fresh-burned lime, 4,500 lbs. of water. First slake the lime to a powder, mix it with the ashes, and placing a layer of bones in a *wooden vessel*—a pit in the ground lined with boards or stone slabs—*cover them with the* mixture, lay down more bones and cover, and repeat this until half the bones, or 2,000 lbs., are interstratified with the ashes and lime; then pour on 3,600 lbs. of water, and let stand. From time to time add water, to keep the mass moist. So soon as the bones have softened so that they can be crushed between the fingers to a soft-soap-like mass, take the other 2,000 lbs. of bone and stratify them in another vessel or pit, with the contents of the first. When the whole is soft, shovel it out to dry, and finally mix with dry muck or loam (4,000 lbs.), or enough to make it handle well."

**Woollen Refuse or Shoddy.**—This is sometimes used extensively in the preparation of new gardens, and with satisfactory results. It is useful in new Vine borders when laid over the rubble in the bottom of them (if their borders be prepared in this way); it prevents the loose earth from filling up the crevices, and acts as a sort of sponge when the borders are watered, at the same time preventing all minute particles from passing away with the water. Some of our agricultural chemists have placed woollen refuse very high in the scale of manures; if we take into consideration the different materials that compose it, they do not over-estimate its properties. Wool and vegetable fibre, saturated with the best animal oil, constitute its principal parts; indeed, the pressing of oil out of woollen waste has become quite a branch of business in the West Riding of Yorkshire and elsewhere. Woollen refuse is slow in decomposing, and for this reason some doubt its fertilizing properties. In Italy, long before this material came to be noticed in this country, woollen rags were used in the renovation of exhausted Orange and Lemon trees; a circular trench in some cases was dug round the trees at a little distance from the stem, and filled in with rags mixed with earth, and firmly pressed down. We have seen it used mixed with the soil for Pines and pot Vines, and with the best results.

Leather parings from the glove factories are extensively used in Dorsetshire, both by farmers and cottage gardeners. They are generally sown thinly in the Potato drills at the time of planting, and their effect upon the crops is simply astonishing. We have also seen it used for Pines with the like results; but experience teaches us that it is better used when partly decayed, and mixed with other fertilizing material. It appears to be almost as powerful as guano, and should therefore be used with caution.

**Salt.**—Salt acts upon crops, for the most part, in an indirect manner. It does not contribute greatly to the growth of plants by its own elements, sodium and chlorine, neither of which are needed by agricultural plants in much quantity. It is therefore frequently of no perceptible advantage. Sometimes, however, a moderate dressing produces remarkable effects. In the soil, salt, like most saline fertilisers, is capable of working chemical changes that may be useful to a crop. It dissolves or displaces one or more elements of nutrition from combinations which the plant cannot overcome, and renders them available. This fact has been demonstrated by numerous chemical investigations. Certain soils may give better crops for a dressing of salt, because the salt by its indirect action is equivalent to an addition of lime, magnesia, or potash. If, however, these be sufficiently supplied by the soil itself, the addition of salt is a detriment, because it makes these elements soluble, only to be washed out by the rain. When we have a deep and heavy (clayey or loamy) soil, which contains at a depth below the reach of tillage stores of plant-food which are too slow in becoming of avail to crops, we can use salt to make them more speedily serviceable; we can, in fact, manure the subsoil indirectly by its application to the surface. When mixed with stable or cow manure, and allowed to remain exposed to the rain and air for a few months, salt is excellent for eradicating worms, slugs, etc., from the manure before it is used, and when applied in this way it has beneficial effects on crops.

**Soot.**—The fertilizing properties of soot are not so well known as they ought to be; were its value more appreciated, every handful of it would be treasured up for garden use, instead of being allowed to be carried off by the chimney-sweep. If inferior to guano, it has this advantage—that it can hardly be misapplied. Owing to the nature of its constituent parts it will be found a suitable manure for growing crops of all kinds. Immediately after thinning Onions and Carrots sown in rows, a good thick layer of soot may be advantageously applied between each drill, and after it has absorbed from the soil moisture enough to thoroughly damp it, with a narrow steel fork loosen the soil between each row, always taking care to thrust the fork well down in the operation; by this means the soil may be gently stirred without displacing the young plants, thus leaving it open and ready for the next process—namely, a good soaking of water. This settles the earth around the newly-thinned seedlings, washes down through the open soil nearly every particle of soot in a few days, and promotes rapid and luxuriant growth. Upon the appearance of grub amongst Carrots this process may be repeated. Indeed, soot may be applied in a similar way to any growing crop with advantage.

**Guano.**—This may be used in the same way as soot, but in less quantities. Upon the whole, however, guano is not a profitable manure when applied to a well-cultivated garden—its strong stimulating qualities having a tendency to excite vegetables to overgrowth; but for poor land, and where other kinds of manure are unprocurable, it is to be highly commended. Its effects upon vegetation being almost immediate, it is especially adapted for plants needing immediate assistance to enable them to bring their crops to perfection.

**Liquid Manure.**—One of the most useful stimulants for vegetable crops is the liquid that flows from kitchens, stables, or cowhouses, which should be run into tanks made for its reception —tanks large enough to hold several tons. The best means of utilizing such liquids as flow from kitchens and washhouses is to make a large tank, the bottom of which should be laid with perforated tiles or flags; over that a layer of charcoal and *fine-washed gravel* should be placed to the depth of 18 in.;

through this tank all liquid from the common sewer should pass, leaving behind a deposit of solid matter that would be rich in fertilizing properties. Liquid from the stable and farmyard can only be applied to the garden during the spring and summer months, but it may be made available at all seasons if combined with solid matter—*i.e.*, if a tank or tanks similar to those just described (with the exception of the filtering bed) were filled with dry earth of a heavy texture. A tank for this purpose, too, can be made for little expense: take a few loads of clay and a load of fine soil, thoroughly well worked together to the consistency of soft putty. After digging out the tank, and the bottom being laid, a course of bricks or stone should be laid upon it all round, about 10 in. from the side, thus leaving an empty space between the bricks and solid earth to be filled in with puddled clay; in this way the sides may be built up until the whole is finished, making a tank that will serve its purpose for many years if kept moist and free from roots of trees. Soft-water tanks may be made in this way of any size.

## Shelter for Vegetable Crops.

Scarcely a year passes without teaching us lessons of the importance of shelter for growing crops. There are so many things in a garden that are tender, or only half-hardy, that gardeners, more than any other class, realize the terrible meaning of late frosts and scathing east winds. The year 1874 will be long remembered for its frosts and winds, nearly as late as midsummer. In the North of England, where the ground is high and inland, the thermometer did not fall below 33° or 34°, though it did so in many places in the southern and midland counties; but the east winds told upon the crops in these parts with destructive effect. Vegetable crops were brought to a complete standstill. The experience thus gained shows more than ever the advisability of returning to the old practice of mixing early and late crops, whenever it is practicable, by running rows of Peas or other tall-growing vegetables at intervals between such crops as Potatoes, French Beans, or Cauliflowers, etc., instead of confining each to quarters by themselves—an arrangement by which ground is saved and convenience gained. Though we do not as a rule advocate this plan of planting when it can be dispensed with, yet it is surprising how much even a row of Pea-sticks will break the blast, or, better still, a few branches of Firs or Laurels. We have noticed the advantages of such slight protectors in many instances. The best way to counteract the effect of frost on tender plants is, however, a matter which requires some consideration. It is necessary to have frames, pits, etc., of all kinds in good repair. Dried Fern is an excellent and cheap covering, and should be kept close at hand, and placed under cover or built into a stack for use when wanted, covering it with tarpaulin or thatch, to keep it dry. Such protections are suitable for frames, or as an extra covering over mats or other thin protecting material in the case of severe weather. Straw litter, dried in the sun and stored loosely, may also be used for the same purpose. The haulm of Beans and Peas, too, makes excellent protecting material, and can be advantageously strewed over dwarf, tender plants, in case of hard frost, and removed when it abates. The stalks of Asparagus also make a good covering for seed-beds, dwarf plants, frames, etc., but, like all other materials of a similar kind, to be very effectual, they must be used as dry as possible; when cut they should be placed erect, but thinly, against a fence or support of some sort, and turned a few times until they have become thoroughly dry; they will then be found to be very light, and should be stored in an erect position in some airy shed or under covering. Heather affords good protection, and in some places it is both plentiful and easily obtained. It forms an excellent thatch for permanent covers, which are very useful for placing over cold frames; and if these have sliding covers thatched with Heather, any other protection in winter is seldom needed. Broom, too, is one of the best and most effectual protecting materials we have: it can be used thinly and just as it is cut; it does not harbour mice; it permits a freer circulation of air to take place about the plants than most other protecting materials; and it has always a neat and tidy appearance. After being used during winter it is useful in spring for shaking in as a shelter amongst seedlings and newly transplanted plants. The best of the stalks will last two years, and what are not available at the end of that time make excellent material with which to light fires. Furze or Gorse is sometimes used for protecting outdoor plants; but owing to its unkindly character as regards handling, it cannot be employed with advantage for ordinary purposes, although it is useful where better material cannot be readily obtained. A piece or two of it stuck into the ground between young plants, so as to cover them over, forms a good protection for them, and in this way they may sometimes be wintered with comparative safety. Rushes and rank Grass cut from the sides of watercourses in summer or autumn, and dried and stored, also answer for coverings. There is one great objection, however, to the use of Grass or hay in this way—and that is the quantity of seeds which they contain, and which are sure to be distributed wherever they are employed. Tree leaves are much used for protecting roots of plants from frost; but, unless they are strewn over with some soil or rough litter, they get blown about in all directions, and thus give the ground an untidy appearance. In protecting Parsley, Onions, and other small plants required to grow and to be exposed, but not frozen, during winter, the protecting material employed should not rest upon them; such plants should, therefore, be planted closely together. Erect a light framework or screen over them, so that some Pea-stakes can be laid thinly over the framework, and this may remain untouched throughout the winter without proving in any way injurious to the plants. In severe weather, some of the above-mentioned materials should be strewed over the stakes at night and removed in the morning, and their use should be discontinued when fine weather again sets in. With mats as protectors every one is acquainted, and of them there should always be a good stock. Evergreen boughs, Spruce branches, and the like, are also too well known to require remark, further than to say that, when placed over or in front of outdoor plants in winter, the plants, if covered up in dry weather, generally escape uninjured, and that, when laid over litter, leaves, etc., they prevent them from being scattered about by wind. Cheese-cloths and canvas keep out spring frosts, but they soon get rotten and useless; while oilcloth and tarpaulin are better adapted for excluding heavy rains than frost. Wooden shutters are good appliances for keeping out either frost or rain, especially in the case of frames where no fire-heat or other artificial warmth can be had. Frost seizes on damp materials more than on dry ones; therefore, whatever is used for protecting plants ought to be of as dry a nature as possible. If mats be used at night, when removed in the morning they should be laid across a rail or fence to dry, or be spread out in some way so as to effect that end. When quite dry, they should be rolled up and placed under cover until they are again required for use. If haulm, straw, or any similar substance be employed, shake it out before the sun in the morning if the day be fine, and then place it under a shed or wooden shutter to keep it dry till it is used again. Never permit strawy débris to remain long in a heap, especially if damp, as fermentation will certainly ensue, and its efficiency will be thereby greatly impaired. Never permit such coverings to remain too long over either plants or frames; on the contrary, remove them early every fine day, and in this way try to get the subjects that have been covered up well aired and dried. Unremitting attention to this secures hardy plants in spring, from not having their young growths injured by late spring frosts. If snow fall thickly and settle upon the covering, let it remain there as long as the weather remains decidedly frosty; but immediately a thaw comes, have the snow carefully removed, for, if allowed to remain until it melts, the cold water will find its way through the covering to the plants, and injure them. If the snow continue for more than a few days, however, remove it, and, if necessary, increase the covering. Snow is a good protector of such plants as are in the ground; but fluctuations of frost, snow, thaw, and sunshine, succeeded by frost again, sometimes kill them. Straw hurdles, too, are extensively employed in many large gardens for covering temporary frames, turf-pits, etc.; and when strongly made they answer the purpose admirably, and last a long time. They are easily made by procuring two strips of wood, or straight Hazel or Hornbeam stakes, say 6 ft. long, across which are nailed or otherwise fastened, 1 ft. apart, other strips or stakes, 4 ft. long. Straight straw is then entwined between the cross-pieces, to make a foundation on which to fasten other straw, which should be laid straightly all over the frame in such a manner as to hide the whole and give each side a smooth surface. This may then be readily fastened to the frame by means of a large wooden needle and tar-twine. A frame of these dimensions will in most cases be found large enough to be conveniently moved from place to place, and if stored away in a dry place when not in use, it will last for several years.

## Implements, Tools, etc.

A good tool-shed is indispensable in every garden of ordinary pretensions, and the more spacious it is the more convenient and valuable an adjunct it will at all times be found to the garden. During bad weather a spacious tool-room is always a convenient place in which to perform many operations that will eventually tend to forward the out-door work, inasmuch as when tools are kept sharp, stakes cut, pegs made, etc., in readiness for use when required, a great saving of valuable time is effected in fine weather. A good workman should always be supplied with good tools, inferior ones being both expensive and troublesome.

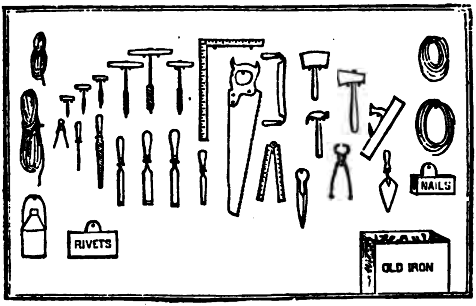

FIG. 1.

“A place for everything, and everything in its place,” will save many hours of searching, many weary steps, and much vexation at all times. Therefore the tools should not only be kept in a room, but each one in its place, ready to the hand; for this purpose they should be hung up against the wall, and be neatly arranged. Nearly every tool can be hung on a spike or pin, or between two large nails. If hung perpendicularly, it will occupy less room, and may be quickly taken down and replaced. Fig. 1 shows the manner in which the smaller tools may be thus arranged; and fig. 2 exhibits the larger tools hung on the opposite wall of the same room. In order that each tool may be always in its place, *a plan devised by Mr.* Townsend Sharpless, of Philadelphia, is an *excellent one. “Hang* each tool in its position; draw its outline accurately on the board wall with pencil or chalk; then, with a brush dipped in some dark-coloured paint, make a distinct representation of the shape of the tool. These outlines will not only show where the tool should be put, but demonstrate at once if any have been left out of place. The consciousness that there is such a tell-tale in the tool-room will stimulate any careless workman to return everything which he takes out.

"The common hoe is probably the most troublesome small garden implement to hang up in the tool-room, out of the way when not in use, and still exactly in the way and so as to be always handy when wanted in a hurry. Vexation is increased at a fearful ratio if you have a dozen of them. The floor of a tool-room should be kept as free as possible from all obstacles to the sweep of the broom. Very likely in a new room you will find the hoes hung over the edge of the wall-plate, or some girt or horizontal timber in the framework, and think they are nicely fixed. The first time you look for your favourite weapon, two or three others are on the top of it, and their centre of gravity is so awkwardly poised that in selecting the one you want you fetch them all clanging down about your ears. A lath nailed across the upright studding is a little better, but not satisfactory. After many trials I have settled upon this as the best way to dispose of that large class of implements with straight handles to which hoes belong :—

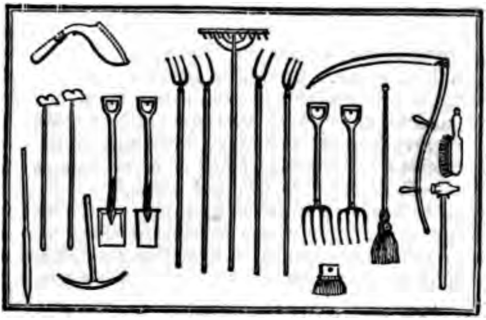

FIG. 2.

"Upon the wall of the tool-room, within about 6 in. of the floor, affix a strip of inch-board, 5 in. wide, shelf-wise. Let this extend twice as long as you think at first you will need, for it is astonishing how the mopsticks, and broom-handles, and other unfashionable utensils, that you are not quite ready to fling away, will gather upon you when once you have a place to put them. This narrow shelf should have inch holes, 6 in. apart, sunk along its centre, *through its* entire length, bored half-way throug board. Also holes rather smaller may be bored midway, near the edge of the shelf. Above this shelf—say 2 ft.—affix another, 6 in. wide, with corresponding holes clean through it—the inner ones 1¼ in., and some of them 1½ in., for larger handles, the beetle, or the iron bar. If slots be cut in the back edge of each shelf, many things will find a place where they will always be in sight and never in the way: the iron wedges, for instance, near the beetle; odd strap hinges and bits of iron or wood, that will be sure some time to be useful if placed where they can be seen in time of need. Such tools as hoes, potato-hooks, garden-rakes, long-handled shovels, spades, forks, and the like, drop into their places at once, and they will stay there. The half-hole in the bottom shelf keeps them steady. Shovels, spades, and dung-forks with short handles are well hung, concave side to the wall, upon stout wooden pegs, set in a strip of 1½-in. board cleated to the wall of the tool-room. How to fix pickaxes and mattocks so that a workman coming tired, with a back-load of tools, would be glad to put them in place, did for a while bother me. I finally fell upon the plan described for hand-hoes, making the holes larger, and the upper ones of an oval shape, diagonally, by boring two holes close together with a 2-in. auger. Choppers' axes come in well between two studs, resting the heads of the axes askew upon a narrow shelf, breast-high, and holding the shelves upright by a cleat 2 ft. higher. Having tools arranged in this way, with variations according to individual fancies or necessities, leads to a precious saving of time and trouble."—*B. B., in "Hearth and Home."*

In addition to having a suitable tool-room and a suitable way in which to hang up the tools, there is another thing of no small importance,—so much importance, in fact, that though seldom carried out as it ought to be, above all other things concerning tools the manager of a garden should see rigidly enforced: we allude to the cleaning of tools after being used. How frequently have we been in gardens and seen the labourers coming in from their work with tools on their back covered with soil, only to throw them down in some corner just as they are, and when they are again wanted for use a considerable time is spent in trying to remove the soil that has become baked and rusted on the blades. It is better to allow even half an hour to clean the tools when they are brought in, than to have the vexation of seeing men take them out to work covered with dirt. Near every tool-shed should be placed a water-tank of some kind, for the purpose of washing the tools before they are hung up; and a quantity of old matting, dry straw, or other material should also be at hand with which to wipe them quite dry, to prevent rusting. Garden lines and such like should be wiped dry previous to being wound up; and last, but not least, all hand-lights, cloches, bell-glasses, and spare sashes, should be cleanly washed, and put away out of reach of breakage, when not in use, and straw hurdles, mats, etc., when perfectly dry stored away, so that they may be in readiness when again required for use.

**A Useful Drill Rake.**—Mr. J. Farmer, Torquay, has sent us a sketch of a drill rake, of which fig. 3 is a representation. He has found it useful for drawing drills for Carrots, Onions, and other small seeds, inasmuch as by means of it four drills can be drawn at once. The old plan still practised in many gardens is to form drills with a hoe, but much time and labour are thereby lost. A glance at our engraving will indicate at once the construction of this implement, which is an improvement on any similar garden drill drawer we have yet seen : and as it can be made by any carpenter in a short time, it is well worth attention. Any kind of wood will answer the purpose of making such an implement, but the harder kinds of wood are the most durable.

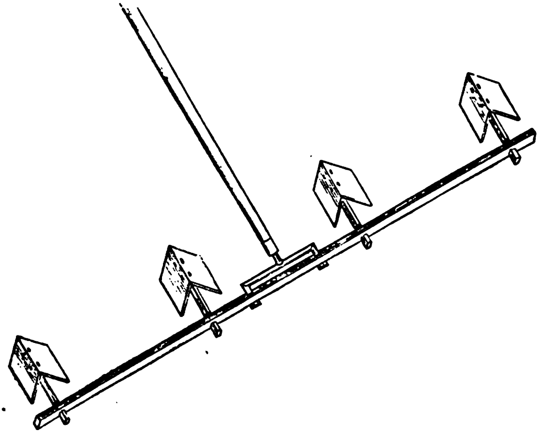

FIG. 3.

**A Handy Garden Marker.**—Markers, for use in the garden, are among the implements that are home-made : in a rough way, pins are set in a piece of joist, and this, when furnished with a handle, answers a good purpose. Those who like to have their garden implements neatly made will be glad of the description (fig. 4), sent us by Mr. D. S. Hibbard, of Carroll County, of a marker which is unlike any we have before seen figured, and which has the advantage of being readily adjustable to make drills at any required distance apart. The way it is made is as follows :—"Plane a piece of inch board 4 in. wide and from 4 ft. to 6 ft. long, and fasten a handle 6 ft. long to its middle, at right angles. The handle should be beveled, so that when in use the board may be in a level position (1), and should be firmly screwed on, as it cannot be braced. Upon the upper side make scratches square across *the board,* at every inch of length, and mark the feet and halves and quarters of feet. Then make several pieces of board (2), each 1 ft. long on top, about 3 in. wide, with each end shaped like a sled-runner, and sharpen the bottom edge suitably for marking drills in the soil. In the middle of each piece, near the top, make a mortice 1 in. by 4½ in. Fit them so that they can be easily slipped on to the long board, or head of the marker, and fastened in any place by wedges. These bits of board can be fastened across the long one at any desired intervals, and the scratches for feet and inches will help to set them square and to regulate the distances. Such a tool, with good usage, will last for a length of time, and will mark drills more smoothly and regularly than can be done in the usual way with the garden-hoe.

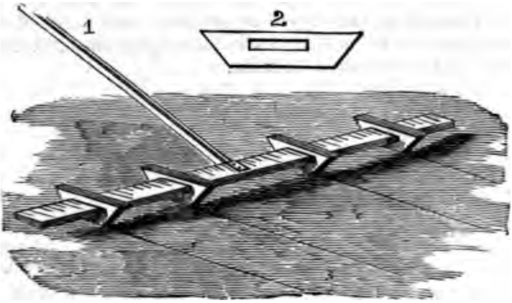

FIG. 4.

**A New and Useful Hoe.**—A glance at our illustration (fig. 5) will show that this is a kind of scuffle hoe, working backwards and forwards. It will be seen that it is diamond-shaped, the points or angles to the right and left being most efficient in plucking a weed out of a corner, or when situated close to a plant. It is worked in the same way as one would use a Dutch hoe. It leaves the ground remarkably level, and can be worked with much greater expedition than the common hoe; indeed, with a large one, 9 in. wide, a wonderful amount of work can be got over in an hour

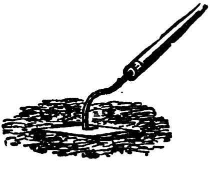

FIG. 5.

or two, and with a 5-in. hoe of this make 150 yards of border 4 ft. wide have been hoed over in less than an hour. One trial of it, in short, is all that is wanted to establish its utility.

**Handy Tool for Transplanting.**—The illustration (fig. 6) represents a wonderfully handy little tool wherewith to transplant Celery plants, Brassicas, or any kind of vegetable seedlings. It consists of two pieces of wood 6 ft. long, 3 in. wide, and 1 in. thick (2). The lower piece, as shown in the figure, is bored with holes 3 in. apart, in which to place wooden teeth of whatever length may be required: 6 in. is, however, about the general depth that holes are made for transplanting most of the Cabbage tribe in the ground etc. The teeth being all movable, holes may be made 3 in., 6 in., or 9 in. apart, or more as required, by taking out each alternate peg. At (3) is a piece of wood 18 in. long, fastened on to the end in a horizontal position. This is likewise bored with holes 3 in. apart, for which only one peg is used, and is made shorter than the other pegs, being used only to mark the distance apart for the rows of holes. One of these end-pieces will answer, but two can be employed if desired, one at each end. The top piece is made to fit on to the other, and is secured with an iron screw and nut at (1), which keeps the teeth in their proper places. This tool may be made any length, and for pricking out beds of plants it will be found very handy. If the teeth be set at the required distance, two men, one on each side the bed, can in a few minutes make thousands of holes, and can then put in the plants and fill in the holes with their fingers or a dibble. Every plant will then be exactly the same distance apart, and the operation of planting is performed in half the time occupied by the old dibble system.

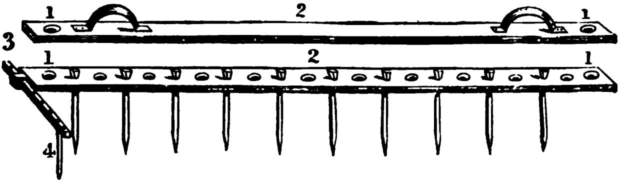

FIG. 6.

**Bean or Pea Planter.**—Fig. 7 represents a serviceable little tool with which to make holes for planting Peas, Beans, etc. It can be made either of wood or iron (the latter is the best), and of any size; and a man may soon make a number of holes, and another following him and dropping in the seed singly, they will get over the work quite as quickly as drawing drills and carelessly throwing in the seed, as is often done.

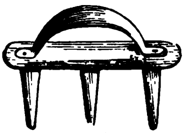

FIG. 7.

**Tube for Making Holes for Carrots, etc.**—Fig 8 represents a tube for making *holes* in which to place good soil for sowing of Carrots, Parsnips, Beet, etc., intended for exhibition. The tube can be made of tin, galvanised iron, or zinc: the former is the best. It has two stout handles at the top; and if thrust into the ground, the earth is readily taken out, and a hole left in which to place fine soil; and the symmetry that the roots obtain by this means is nearly perfect.

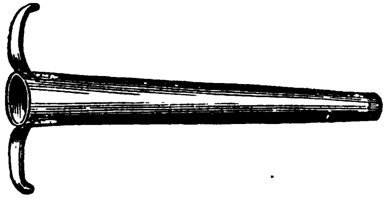

FIG. 8.

**The Cloche Protector.**—Fig. 9 is a sketch of a simple and inexpensive protection for plants, either under cloches, as represented, or grown in the ordinary way. The cover is made of bands of straw interwoven with cord, so as to make a firm mat 2 ft. or 3 ft. in width, and of any length that may be found necessary. At each end of a protector of this kind is affixed a wooden margin, hinged on to a peg which is sunk into the ground, as shown in our illustration. It will be at once seen that the protector can, by this simple arrangement, be set at any angle; thus forming an efficient defence against both cold and sun, and a useful aid in the raising of seedlings and tender crops.

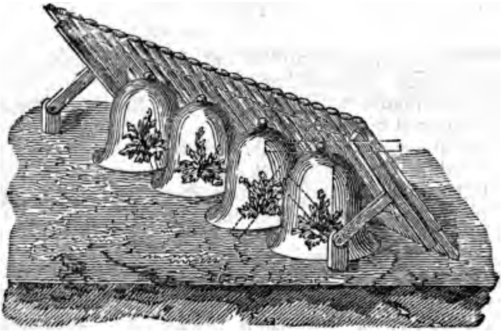

FIG. 9.

## Seed Sowing.

One of the most important matters connected with the kitchen garden is that of keeping up a constant supply of fresh vegetables, fit for the table, at all seasons of the year. No matter whether the garden is large or small, a supply of vegetables in proportion to the demand is generally required. Although this branch of gardening as a rule is not so interesting to either amateur or professional gardeners as other branches, yet it is by no means the least important,—neither can this department be efficiently managed with less forethought and skill than other departments.

In order to keep up a good and regular supply of vegetables, attention must of course be paid to times of sowing and planting. Although it often happens, through the inclemency of the weather, or some other unavoidable cause, that the gardener has to put off from time to time many important operations that ought to be at once performed, yet it is advisable never to defer getting in crops, if it can possibly be done at the time, as to do so means a standstill in the supply sooner or later.

It is also very important to obtain good seed; and this can only be done by purchasing from respectable seedsmen, or saving them yourself: and the latter will never pay—at least in small gardens.

Most experienced cultivators are aware that the brightest, heaviest, and newest seeds are, as a rule, the best and the most likely to produce the finest crops. This is an important fact, and one which is too often overlooked. It is a matter, however, which concerns the seed-grower as much as the seed-sower. The gardener can to some extent make up for want of vigour in his seedlings by generous after-treatment, and it is astonishing how much can be accomplished in this way; but we must not forget that a poor seed-bed will never furnish strong plants, let the seed be ever so good; and it is a great benefit to have good, heavy, and well-ripened seed to start with, for, other things being equal, it will always give the best results. High culture is not the rule with all seed-growers, neither are our vegetable seeds as large and good as they sometimes might be. Seed-growing, like many other matters, is a question of production with the least amount of expense as regards those seeds which are in most demand; but with many garden seeds, such as Peas, Beans, Scarlet Runners, seeds of the Brassica tribe, Melons, Cucumbers, etc., a certain amount of care in the culture of the plants and in the selection of the seeds is quite practicable, and would no doubt pay in the long run,—for there is nothing more certain than that when a member of the trade becomes noted for a "good strain" of any particular plant, he is sure of customers. Another question of some practical importance regarding the qualities of seeds is the belief very commonly entertained that new seeds, as in the case of the Melon, Cucumber, Tomato, etc., and other annuals grown for their fruit, are not fruitful— the common notion being that they run too much to foliage. Many growers, if they cannot procure seed old enough, will carry the new in their pockets for weeks, or lay it on a mantelshelf above a fire in order to weaken its vitality, in the belief that they thereby ensure a better crop of fruit. The only effect such treatment of the seed can possibly produce is debility in the plant; and it is almost universally agreed that a weak plant is not so likely to produce more or better fruit than a strong one. By trying old and new seed separately, our experience is that although the old seed produced fruit a little earlier, the new produced plants which, if allowed to extend themselves, bore fruit more abundantly and of better quality. New seed is therefore preferable to old, and should in all cases be sown in sufficient quantity to ensure, not only as many plants as are required, but enough to enable you to select good strong plants from. Unless provision is made for failure by duplicate sowings, great inconvenience is frequently the result. *J. G.*

## Rotation of Crops.

Market gardeners till deeply, manure heavily, and plant whatever crop happens to be ready for the ground. That this is the best and most convenient practice for the cultivator for market is unquestionable, for he cannot afford to have his ground vacant; and, as he plants it two or three times during the season he cannot follow up any system of rotation with regularity; but he adopts the practice when he can. With a gardener in a private establishment, however, the case is different. His object is not to raise and turn crops off the ground as quickly as possible, but to wait upon and suit the wants of his employer, and at the same time to produce good crops. The example of the market gardener he does well to follow when necessary; but, as his ground is not cleared so frequently, and as he rarely uses a tithe of the manure—not having it to use—that the market gardener does, he is of necessity compelled to adhere to the rotation principle as strictly as possible. It has never been satisfactorily explained on scientific grounds why a rotation of crops is necessary; but that it is necessary, and absolutely so, nobody for a moment doubts—the evidence on that head is too conclusive. Physiologists at one time supposed that plants threw off some kind of excreta from their roots which were injurious to after-crops of the same kind; but, it being found that plants in a healthy state did not excrete any substance whatever, this hypothesis was given up as untenable. The next and most plausible explanation is, that by cropping the ground often and repeatedly with the same kind of plant, we exhaust the soil of the food which that species requires—starve it, in fact. No doubt this practice does impoverish the soil; but experiment has demonstrated that the supposed exhaustion may be made good without any disadvantage if rotation be neglected, and this is about as much as is known at present. The uncertainty which exists on this point need not, however, affect our practice very seriously, or hinder a well-tried system of rotation from being carried out.

The common rule with cultivators is to let each crop be as unlike that which has occupied the ground before as possible. If this cannot be managed—if Cabbage must follow Cabbage, Greens, or Turnips, or any of the Brassica tribe, for example—then the only plan is to trench the ground 2 ft. or 3 ft. deep, and manure as liberally as can be afforded. Not, however, that crops will refuse to grow, or seriously fail, if the same kind of crop occupy the same ground for a few years in succession without its being more than simply dug and manured. Plenty of people are obliged to plant their vegetables on the same piece of ground for years in succession, and yet they secure very fair crops; but the returns grow less and less annually. Fortunately for cottagers and others, the Potato submits to the repetition system better than most vegetables. Provided the ground be fairly manured annually, it will produce good crops for a number of years. I am acquainted with plots that have been cropped with Potatoes and nothing else for at least fifteen years, without even being once trenched; and the crops have always been equal, if not superior, to the generality of field crops in the same neighbourhood. To attempt such a practice, however, with subjects like the Kales, Carrots, Onions, Peas, Beet, Parsnips, etc., would be very unwise. The rule laid down for our guidance—viz., that plants of the same Order should not succeed each other—is rather too vague for practical purposes; but the following directions as to change of crops will meet the wants, in most cases, of those who have to crop their garden ground economically, and as cultivators have often to do, on the mixed system; that is, cropping between the rows of main crops with other things—as, for example, sowing Spinach or planting Cauliflowers between rows of Peas or Celery, etc.—a common practice in almost every garden. Acting on the hint already given, that each crop should be as unlike the preceding one as possible, it of course follows that root crops should not follow root crops, and *vice versâ;* neither should very exhausting crops follow each other; but partial rest should, as far as practicable, be given to the soil by following a heavy and exhaustive crop with a light one. None of the Brassica tribe should follow each other, but they may succeed Beans, Peas, Potatoes, Onions, Celery, Beet, Parsnips, or Carrots. Peas may succeed any crop but those of the Leguminous class, and may particularly follow Potatoes or other root crops, Onions, and Celery. Onions and Leeks come after Celery, the ground being as a rule well manured for the last crop, and just in condition for Onions. Beans and Kidney Beans may, like Peas, follow any crop not belonging to the pod-bearing class, and may be succeeded by any of the Kale tribe—Beet, Spinach, or any spindle-rooted crop. Carrots may follow any but root crops or Parsley. Spinach may succeed Peas, Beans, Potatoes, Onions, Lettuce, or any crop but those of the tap-rooted section, especially Beet, to which it is allied. Seakale may follow any crop but those of the Cabbage tribe. Shallots and Garlic the same as Onions. Lettuce and Endive may almost follow any crop, being shallow-rooting plants, and greatly influenced by the way in which the ground is dug. Celery, owing to its peculiar nature, may succeed any crop, whether belonging to the same Order or not: the ground being dug, specially manured for it, and deeply turned up, it is not affected by the previous crop. Turnips are benefited by rotation more than almost any other crop, and should never follow any of the Crucifers within two or three years, unless the ground can be well trenched and manured. Potatoes do well after Peas, Beans, Celery, Spinach, or any other crop, but manure must be applied according to the exhaustive character or otherwise of the preceding crop. Although these directions can only be partially followed out in any garden, yet they indicate the course to be pursued as opportunity affords.

The system of endeavouring to obtain other crops between the main rows, necessarily followed in most gardens, complicates the rotation system; but in such cases—as, for example, when Spinach or Cauliflowers are grown between rows of Peas or Beans, the best plan is to mark where the rows have been, and to crop the ground with the same subjects two years running—only the Peas must be put where the Cauliflowers were the previous season, and *vice versâ;* then the third year follow with a whole crop, such as Potatoes. In kitchen gardens, owing to the disproportionate amount of space occupied by different crops, shifts of this kind have often to be resorted to when trenching cannot be done. Early borders have perhaps less respite as regards rotation than any other part of the garden, such quarters often being annually cropped with Cauliflowers, Peas, and Potatoes, without even being once trenched—the roots of the fruit trees preventing the performance of that operation. The practice is to devote about an equal portion of the border to the three vegetables just named, pushing the Peas on to the Potato ground of the previous year, the Cauliflowers on to the Pea ground, and the Potatoes on to the ground vacated by the Cauliflowers. Thus the round goes on year after year, and usually a snatch crop of Lettuces, Spinach, or something else, is taken off the same border in autumn. Such hard-worked ground must, of course, be liberally manured. It should also be limed frequently, and fresh loam and refuse soil from the potting shed are excellent fertilizers. The practice of wheeling the top spit off altogether to any quarter of the garden where the soil is heaviest, and wheeling as much back again from the quarter in question to the border, in some instances is found to be highly beneficial to both quarters of the ground.

## Preparing Vegetables for the Kitchen.

Packing vegetables for transmission by rail comes under this head; for the quantities of vegetables now sent to London during the season, from private establishments in the country, are enormous. In each case the value of the produce so sent depends upon *the way it is packed,* despatch in forwarding it, and prompt unpacking *and attention on* arrival. Neglect in these matters often causes great loss. The hampers should be made of the best white willow, be extra strong, and fitted with wooden "clogs," as the basket-makers term them, and furnished with strong bolts, hoops, and padlocks. In size they should be 2½ ft. long by 18 in. deep and 18 in. wide, or at most they should not exceed these measurements by more than 6 in. Large hampers are unmanageable in many ways, and a great bulk of green stuff is apt to ferment. They should always be sent by passenger train, unless special arrangements can be made for speedy transit by goods, which can seldom be done when the distance is great. If it will not pay to send vegetables by passenger train under such circumstances, neither will it pay to send them by goods train. The best time to pack is early in the morning : vegetables are comparatively flaccid after the sun has been shining upon them for the greater part of the day. It is a frequent practice to wash Potatoes, Turnips, Beet, and similar roots before packing, but this is a great mistake,—the less they are exposed to the air the better; and washing and scraping them long before they are cooked is simply injurious. Potatoes need have no surplus soil about them, but they are usually clean enough as they come out of the ground. Potatoes from the market can never compare with those just out of the ground, and their inferiority is simply due to exposure. Turnips should have their tails left on, and their leaves docked to within an inch or two of the crown. Carrots should be treated in the same manner Beet-root should be got up with every fibre attached to it, and should be bedded carefully in some soft material, such as Spinach, to avoid bruising it. Parsnips, Scorzonera, and all the Crucifera tribe should also be cared for in a similar way. Cauliflowers should be cut with a fringe of leaves to them. Cabbages should not be divested of all their outer leaves. Lettuces and Endive should be cut over at the surface of the soil, or pulled up by the roots, and they, more than anything else, should be packed dry ; and small salads, like Mustard and Cress, should be packed by themselves in a small box or basket, as they soon go bad. Little danger is to be apprehended from heating during the transit by rail; but if the hampers be not unpacked for some hours after arrival, as often happens through carelessness and other causes, the green vegetables are sure to be more or less spoiled. For these reasons, Spinach, Brussels Sprouts, Greens, etc., should not be packed together in a lump, but separated by a layer of Peas, Turnips, or any other vegetable which permits the air to circulate freely amongst them. Assuming that a cellar or cool store-room is provided for them, the kitchen authorities should unpack everything as soon as it reaches its destination. Potatoes, Carrots, Turnips, Onions, and other roots, will not deteriorate greatly before they are used, if kept in the dark ; but Lettuce, Cauliflower, Spinach, and other Greens, soon get soft if left uncovered. The best plan is to lay them out thinly —not in heaps—and cover them with a dry cloth, which by preventing evaporation effectually, keeps them quite fresh for a considerable period. The practice of drenching them with water, or, as is often done, *plunging* them into a tub of water, to lie the till wanted, should be prohibited by any cook. Small salads should be laid out on a tray, and covered with a sheet of paper. If they appear to be flagging, they may be first sprinkled slightly with a little clean water; but this is seldom necessary. Cucumbers may be treated in the same way, or placed with their footstalks in a saucer of water. Peas and Broad Beans take little harm; but French Beans get soft if not placed in water like Cucumbers, or covered like the others. Asparagus, if required to be preserved for ever so short a time, should be covered with moderately dry earth or sand; and so also should Horseradish, for both deteriorate quickly—the Asparagus losing its flavour and the Horseradish its piquancy.

At home there is less difficulty in the matter. Some cooks like a store of vegetables by them, even though the garden be at the door; which is simply ridiculous and productive of waste. The supply should be taken in every day as wanted. It is not necessary that the vegetables should have the soil hanging about them in lumps, but all washing should be done by the cook, and just before they are used. Of course, if desirable always to use vegetables in as fresh a condition as possible, it cannot be advisable to store root crops in winter more than can be helped. Potatoes must be taken up as a matter of course—it is not practicable to have them in the ground—but we have often been struck with the freshness and superior quality of tubers which had by accident been left in the ground all winter. Winter Turnips should be, and generally are, used off the ground; but Beet, Carrots, and Parsnips are usually lifted. Lifting is not necessary, however, in their case, if a little protection can be afforded. It is advisable never to lift any of these except in the prospect of a hard frost, and then only a few for the time being. A layer of dry leaves or litter scattered thinly over their tops is sufficient protection. In the case of Beet, which grows with its crown well above the surface of the ground, drag the litter in amongst the roots and about half-way up the leaves, but never cover them overhead unless in frosty weather, and then a little dry straw may be thrown over them,—but it ought to be removed when the frost disappears, otherwise the crowns are apt to rot. *J. S.*

# CULTIVATED VEGETABLES.

## The Globe Artichoke

(*Cynara Scolymus*).

The Artichoke is a native of North Africa and the south of Europe; but it has been so much altered by cultivation that it might easily be believed to be specifically different from the wild type. There are now several varieties, which differ one from the other in height, foliage, and hardiness. The useful portion of the Artichoke is the flower-head, of which the fleshy scales at the base, as well as the receptacle, are eaten. The Artichoke is cultivated extensively in England, and also in many parts of France; but it does not prosper equally well everywhere, and each province has its variety to which it gives preference, or which thrives better than other kinds. The Artichaut de Laon is considered one of the best varieties, the heads of which have scales more fleshy at the base than the ordinary kind, and not placed very close one to the other. This is the variety most commonly cultivated in the neighbourhood of Paris.

**Culture.**—The culture of the Artichoke varies somewhat according to situation and climate. In the north and midlands, it is necessary to cover it in winter with litter or leaves, to protect it from frost; in the south it is sufficient to earth it up, but even this precaution is not taken everywhere. The plants are increased by seed and offsets. Varieties of it, however, do not always come true from seed, and they require, besides, more time than offsets before they are fit for consumption; the latter mode of propagation is, therefore, that most generally adopted. Near Paris the offsets are taken off in spring; in other districts the operation is deferred till autumn, as this is thought to produce better and earlier returns. Some growers prefer planting in pots until the offsets have fairly rooted, after which they are planted out with a ball. It is said that Artichokes thus treated are fit for use sooner than under the ordinary method.

The Globe Artichoke is considered a very wholesome vegetable, in many establishments it is highly esteemed, and with good culture it can be obtained in great perfection for at least six months in succession. Commencing with the old-established plants that have been protected through the winter, these will afford the first supply in May and June; and, for the next two months, good heads may be had from a planting of strong suckers made in March; and, for the end of summer and autumn, from a successional planting made in May. Another very good plan is to cut back, close to the earth's surface, a few old plants early in spring, and occasionally afterwards. These will produce a thicket of shoots, which should be early thinned by pulling and cutting the weakest, and allowing only a portion of the strongest suckers to remain. These will produce, in succession, nice young heads. The Artichoke, if cut when about half grown, possesses a very pleasant flavour, and is a very delicate vegetable; but, if the heads be allowed to attain their full growth, or nearly so, they are not so fine in flavour, and have lost most of their tenderness, so that only the base of each scale and the base of the head are fit to eat; whereas the whole of a young head may be eaten. The Artichoke will grow luxuriantly in rich boggy land in summer, and is not at all a bad-looking plant in large borders and wild gardens, with its noble foliage of a kind of bluish-green, and with its large heads of flowers of a Borage-like blue colour; but it will not stand our winter in wet quarters. As a kitchen-garden plant, it will grow on any kind of soil, if well manured, trenched, and pulverised; but no soil suits it better than a good, open, sandy, rich loam, trenched and well manured. The plant is in its best perfection at the second and third year after planting.

Years ago it was the custom in most gardens at the approach of winter to cover the plants entirely, or nearly, with litter, and then to bank them up with earth, in which condition they remained through the winter. The Artichoke is, however, much hardier than was at that time supposed; and plants that do not have any protection at all seldom suffer injury from exposure to the weather. All the protection they require in severe weather is a few dry leaves or a handful of Bracken placed over the crowns of each plant, to be removed when the weather changes. Globe Artichokes are often allowed to remain too long in one spot, and where this occurs the heads all come into use at one time. The best way to remedy this is to make a small plantation every year.

Artichokes may be often seen in a state of semi-starvation under trees, or in some other such inappropriate situation, where neither light nor sun can reach them, frequently remaining thus for years. A clear, open piece of good soil, well manured, deeply trenched up into rough ridges, to get well pulverised and sweetened by atmospheric influences, free from trees and hedges, is the proper place to plant Artichokes—planting the first batch in March, and for succession another in May, afterwards keeping them thoroughly clean and maintaining an open free surface by often hoeing and scarifying the ground about them; by this means a dozen stools will produce as many fine rich heads as double the quantity will do by the old-fashioned crowding, neglectful system of planting. To plant properly, make choice in early spring of good strong suckers, take off the stools carefully with a sharp strong paddle-trowel or Asparagus knife, with some root or heel of the old stool to them, to hold them in the ground; plant them singly 2 ft. apart, in rows at least 4 ft. apart, or in groups of three in triangles, at 4 ft.

apart at least in the row. Protect them as soon as planted, against the sun and cutting winds, with the Seakale pots, which are at this season out of use, or with evergreen boughs, or some other convenient protecting material. Those thus early planted will produce fine free crisp heads the same summer and autumn. If the stems also be cut close to the ground as soon as the heads are cut, new suckers will soon appear, and if duly thinned will produce a late crop: thus by a little trouble and attention a regular supply of good Artichokes may be had from May to October, which will be much more satisfactory than having a glut at midsummer and none afterwards. The aim should be to get the largest supply at a time when other vegetables are generally scarce.

Copious supplies of manure water may be advantageously given to Artichokes during dry weather, especially in the case of old stools that have been in the same soil for a length of time. Previous to watering, the soil between the rows should be slightly pricked over with a fork, to allow of the water soaking in more readily. Whenever watering is attempted let it be done thoroughly, and if a good mulching of half-rotten manure can be afterwards applied between the rows, it will keep the roots in a moist state for a long time, and the effects of the watering will soon be seen.

## The Jerusalem Artichoke

(*Helianthus tuberosus*).

This is a tuberous-rooted species of Sunflower. Very little instruction is needed "how to grow" this vegetable, inasmuch as even Docks or Nettles are weak compared with its rampant vigour, and it will grow in any soil or any aspect; but for all this it is little appreciated. The Potato has furnished so many disappointments during the past twenty years or more, that we think in bad seasons this might be looked to as a substitute. To many it may appear inferior to the Potato in nutritive quality, but analysis has proved that it is so in but a slight degree; and when properly cooked and prepared a dish of Artichokes is very agreeable. When Potatoes, in addition to disease and bad quality, take to supertuberating, which they frequently do, a store of this hardy root becomes invaluable. Where the slightest knowledge of cookery exists there can be no difficulty in serving it up in an agreeable manner; and it would be a boon to the poorer classes of cottage gardeners if this vegetable, and some simple but agreeable mode of serving it, were commonly known amongst them. As regards cultivation, it is often left alone in some bye-corner to take care of itself—for it is said that on account of the propensity of every little tuber, or small bit of root, to grow, it is not easy to get the land clear of it when once planted. If systematically cultivated, however, it is as easily and cleanly forked out of the soil, when ripe, as the Potato is, but the frost will not destroy any of the

Artichoke tubers that may be left in the ground, or on its surface either, as it would Potatoes. The Jerusalem Artichoke is an extraordinary cropper, and free from any kind of disease, so that an abundant crop is certain with but little trouble in the preparation of the soil, and without the application of manure—which this Artichoke does not require. The only insect that attacks the Jerusalem Artichoke in summer is the wasp; when these are plentiful, in a hot, dry summer, they will attack the succulent stems of the Artichoke, for about a foot above ground, in such numbers that if left alone they will suck them dry, and kill them in a short time. In winter, if within reach of pheasants, they will scratch them out, and so will poultry.

**Culture.**—Although, as before stated, this Artichoke will thrive in any kind of soil and in almost any situation, yet to grow it well, solid, and of a nice flavour, a good deep sandy loam, free from trees, is the best. This should be well trenched—that is, deeply—in winter, cast up into rough ridges, to sweeten and pulverise, and the bottom of each trench, as cleared, should be forked up with a strong fork and left loose; plant any time in the month of February; choose moderate-sized tubers, and place them at the bottom of every alternate ridge—that is, supposing the ridges to be 2 ft. apart—and place the tubers 2 ft. apart in each row; tumble the ridges down on them with a fork roughly, to be hoed or scarified amongst the plants as they appear above ground, keeping a loose, healthy earth surface amongst them by repeated scarifyings, etc. The tubers will soon grow on and take care of themselves; and if subjected to deep culture and cleanliness, the Artichoke will grow from 10 ft. to 16 ft. high, and produce immense crops, such as no other tuberous-rooted plant will in our climate. They are at their prime for culinary use from the middle of October till March. They are generally boiled, but they are greatly improved in flavour and solidity by steaming them—a good handful of salt being placed in the water. They are also very good baked, or cut into slices and fried in the same way as Potatoes; and are also valuable for feeding poultry and pheasants. By long practice in their culture it has been found best to leave them in the ground where they grow till wanted; after being ripe, cut off the stalks a foot above ground, in order to know where the rows are, and to prevent the wind blowing away the protecting material, which in winter should be placed a few inches deep over the surface. This may consist of leaves, Fern, or light litter; and should have something placed on it to prevent it being blown away by the wind.

The tubers may be all cleanly trenched out in February, casting the covering refuse in the bottom of the trenches, the ground roughly levelled and planted again in the spaces between the previous rows. The Jerusalem Artichoke may be advantageously used as a screen in summer, to shut out unsightly objects, and if in positions where they can get plenty of sun and air, good tubers may be had from them.

When used for this purpose it is not necessary to make fresh plantations every year, but simply dig up the best of the tubers and allow the small ones to remain; if the soil be moderately rich, they may be grown in this way for years.

In open situations it will be often found necessary to afford some support to the plants, otherwise they are liable to be broken by the wind. Strong twine fastened to stout poles driven in the ground, answers as well as anything. Watering, or mulching, is not required except in very poor, shallow soils, when it may be applied with advantage.

In some countries the Jerusalem Artichoke is as troublesome to get rid of as many weeds. In Germany it is cultivated to a considerable extent, and has its place in rotation before winter grain; and in order to effectually exterminate the tubers from the ground before it receives other crops, flocks of sheep are turned on the land, which eat off the young plants as soon as they appear above ground, and the plant ultimately dies from want of that support which it can only receive from leaves.

**Jerusalem Artichokes in Market Gardens.**—These are not much grown in market gardens in the neighbourhood of London—Mortlake and Fulham Fields being, perhaps, the only places where they are grown in quantity. As this vegetable will succeed in almost any place, it is generally planted on gravelly pieces of ground that would be too dry for other crops. Knolls or mounds are usually cropped with it, and it is also grown along the sides of hedges, and in shady places. Mr. Poupart, however, grows his stock of it on a very fine alluvial soil, open and somewhat dry in the summer, and the result is an abundant crop of fine tubers. After preparing the ground by manuring and digging or trenching it, the tubers are planted in February, in rows about 2 ft. apart, like Potatoes, and are allowed to grow unchecked, and without being earthed up, till November. By this time they will be ripe and in good marketable condition. The stems, which are sometimes killed by the frost, are cut over close to the ground, and earth is spread over the tubers to exclude frost. The tubers are lifted for market as required, for it has been found that their flavour is better when treated in that respect, like Carrots and Parsnips, than when lifted and stored in pits. In February all are, however, lifted, for if left longer they would be useless for culinary purposes; what are required for sets are then saved for that object, and the remainder sold.

## Asparagus

(*Asparagus officinalis*).

The Asparagus belongs to the Lily family, and is a member of a large genus of plants, mostly natives of Africa, distinguished by fine small leaves, which make some of the kinds very graceful and elegant. The common kind is a native of sandy shores all round the basin of the Mediterranean, and grows along those of Western Europe, till it reaches the western and south-western shores of England. It also grows on sandy plains in South Europe and North Africa. Although there are said to be several varieties of cultivated Asparagus, they resemble each other so closely that it is almost questionable whether more than one distinct kind really exists. By good cultivation, however, it may be grown much finer in some places than in others, and from this fact probably arise the imaginary new kinds. To grow good Asparagus, high culture and liberal treatment are necessary, and there is perhaps no vegetable that will better repay the trouble bestowed upon it.

**Soil, Manure, etc.**—Soils, subsoils, and situations differ, and so must practice also. The soil all round our sea-coast, if rich, is eminently suitable for Asparagus; and once properly planted, it might go on for half a century without any more assistance than it gets from the flooding of each spring tide. Change the scene: place the beds in Sherwood Forest, with from 10 to 20 ft. of drift sand underneath them, and, without the liberal use of the manure cart, in seven years you would not have a piece of Asparagus as thick as a pipe-stem. For good and lasting beds of Asparagus, considerable depth of soil is requisite. The best soil is a rich friable loam; but good crops may be obtained from any good sandy or mellow loam. Should the texture of the soil be too close, it should be sufficiently lightened and made porous by the application of large quantities of manure; sand or sandy mud is, however, more beneficial than manure in its opening qualities for heavy soils. The situation for this vegetable should be open to the sun, yet sheltered from strong winds. As Asparagus is one of the most permanent and important of all garden crops, and well-made beds continue in a good bearing condition for twenty years or more, it is advisable to decide, before forming the plantation, whether or not any alterations are likely to be made that would in any way disturb the beds. The ground should be trenched to the depth of 3 ft., at the same time turning in a heavy dressing of manure and seaweed (should the latter be easily obtained, otherwise it would not be advisable to go to the expense of procuring it, as very good Asparagus can be grown without it); and should the ground be deficient in depth or quality, some good sweet loam from an old pasture may most advantageously be employed. These ought to be thoroughly incorporated with the soil at the time of trenching, and so worked that they may have an enriching and ameliorating influence on every particle of soil in the beds. This trenching should be performed in the beginning of winter, and laid up in the common way of ridging, thus to remain till spring, when, towards the end of March or first week of April, according to the state of the weather and condition of the ground, the ridges may be levelled, choosing for the operation a fine dry day. Fork and tumble over with a strong fork or pickaxe the ridges at all times *when frozen hard,* in order to pulverize, sweeten, and incorporate *all well together.* The principle of success with this vegetable lies within a small compass. All seem to acknowledge that, in order to obtain a good crop, there must be a good depth of rich soil. About forty years ago a good piece of ground was chosen to make a permanent plantation of Asparagus. It was trenched about 3 ft. deep and 3 ft. wide, and thrown up into rough ridges, after a crop of summer Peas. All decaying vegetation in the rubbish-yards and corners was at the same time well salted and turned up. Early in autumn, also, were added some old Mushroom, Melon, and Cucumber-bed material, a lot of manure from piggeries, cow-houses, and stables, a quantity of road-grit and sand, a quantity of ditch and drain parings, turfy loam and turves, quite 3 ft. thick. These were all turned over four times and well incorporated together, between Michaelmas and Lady Day, as one would a manure-heap—the whole being left in large ridges exposed to the frost. By April this compost was in a kindly state; it was, therefore, laid down and planted with good, clean, one-year-old Asparagus plants, which certainly grew in a most extraordinary way, and the second year produced wonderful shoots as to size; and the same plantation has continued to produce fine heads ever since. In order to give a fair idea of the quality of "grass" which this plantation is still producing, it may be mentioned that one hundred heads cut from it now average from 12 lbs. to 14 lbs. weight, the heads being 7 in. in length. Even after forty years' existence, this plantation is still improving, and it looks as if it would be as good sixty years hence as it is now.

Wherever ordinary farmyard manure is not very abundant and labour plentiful, a good result may be obtained by collecting together all decomposing vegetable matter—old hotbeds, Mushroom beds, pig refuse, or seaweed; and, when the position for the beds is determined upon, this should be spread upon the ground about 1 ft. thick, and turned over with 2 ft. or 3 ft. of the earth two or three times in winter. This treatment will be attended with very excellent results. Where seaweed can be readily obtained it is excellent manure for Asparagus when mixed with other material.

The application of salt as a top-dressing is of great benefit to Asparagus in inland districts, but is of little or no value in the vicinity of salt water. It should be applied in spring and very early summer by scattering some common coarse salt over the ground in showery weather. Old and well-established plantations are particularly benefited by this treatment; but in no case should it be applied to plants recently removed, for all such, however carefully transplanted, must have wounded roots, to which salt would prove very injurious; nor should it be applied at any time when the roots are in a dormant state. Besides its beneficial effects upon the plant as a manure, it is very destructive to the wire-worm and other insects so injurious to the roots of the Asparagus. Salt may safely be applied at the rate of 2 lbs. per square yard. It is, however, better to give this quantity in two doses. It should not be applied in dry or sunny weather.

**Seed Sowing.**—Asparagus is propagated by seed, which may either be sown when ripe in October, or in spring; but the latter time is certainly the better. It may either be sown on the ground prepared for the plantation, or in drills 1 ft. apart in beds of light, rich, sandy soil, and transplanted to a permanent position when one year old, which is by far the more desirable method. Get strong clean plants at one year old, and to save a year's strength, sow thinly, and hoe out quickly after the plants are up, with a sharp one-hand 3-in. hoe, or otherwise thin the plants to 3 in. or 4 in. apart, taking care to select all the strongest plants to stand; thus very strong clean plants may be produced in one year. By keeping the seed-beds carefully hoed and free from weeds, the plants will be in fine condition for planting out the following spring; whereas, should they be neglected, it will take two years before they are as large as well-cultivated one-year-old plants. It is in consequence of this very common neglect that many cultivators labour under the impression that the plants must be two or three years old before planting; which is undoubtedly a mistake, for all good growers invariably plant one-year-old plants, and count on reaping a crop the third spring from the time of sowing. One pound of seed will produce about 3,000 plants, and to plant an acre of Asparagus requires from 15,000 to 20,000 plants. Some of the finest shoots which push in the early part of the season from certain crowns should be allowed to run to seed. These should have the full benefit of exposure to light and air; and, as they advance in growth, they must be firmly staked, to prevent breakage by wind. When fully ripe, the largest and finest berries, of the deepest red colour, should be selected. They should then be carefully and gradually dried; or they may, after lying about ten days, be squeezed between the hands, and the pulp washed away; but by the former method they keep the longest.

**Planting.**—This should not be done till after the buds begin to push, as this plant, from its peculiar succulent roots, is less susceptible of injury from late planting than most other vegetables; yet it should not be delayed too long after the ground has become fit for its reception in the end of April, as the sooner it is then planted the better will be the result. Plant in rows 2 ft. apart, 16 in. being left between the plants in a row. Planting in rows in preference to beds is recommended, for by so doing the plants are allowed room enough to develop their roots without interlacing each other, and consequently causing an impoverishment of the soil. After being planted two years, every alternate row is best taken up for forcing, thus leaving the permanent rows 4 ft. apart. The direction of the rows for the main crops is immaterial, but for the earliest ones it would be advisable to run them east and west, so as to be more immediately under the direct action of the sun's rays when they are most powerful. As soon as the Asparagus has commenced to shoot an inch or two, level the ground down methodically, mark out the rows 2 ft. apart, placing a stake at each end, where the rows are to be planted; stretch and place the line tight from end to end, draw a deep drill with the hoe on each side of the line, thus leaving a little ridge under the line, over which the planter should regulate the roots of the plants on each side, putting in the earth to cover them quickly as he proceeds. The hoe should be regularly used during the remaining summer and autumn months, care being taken to remove by the hand all weeds that come up about the crowns. When the stalks are completely withered in autumn, they should be cut down. Should the produce in spring be required in a green state, which is decidedly the best, an annual dressing of good manure slightly forked in should be given every autumn after the haulm has been cut, and thus left during the winter. In spring, before the buds begin to push, the ground should be again slightly forked over three or four times in dry weather, in order to lighten, pulverise, sweeten, and lay it down in an open healthy state, and not in too fine a condition, to get run together again immediately after the first heavy rains, but open, loose, and rather rough, in order to admit freely the sun's rays, atmospheric influence, and the rain; such treatment not only forwards its progress, but also allows it to grow freely, clean, and straight without obstruction.

**Age of Plants for Transplanting.**—For planting, cleanly-grown and sound two-year-old plants are very generally preferred, although strong one-year-old plants are equally good. The balance of evidence is, indeed, in favour of well-grown one-year-old plants. The following curious experiment by a trustworthy French cultivator deserves consideration.

"By planting (No. 1) twelve roots of a year old, (No. 2) twelve of two years old, and (No. 3) twelve of three years old, the following results were produced:—

"First Year.—Of No. 1 all had made growth before May 4th, and the vegetation was fine. No. 2, ten plants started before May 4th, one on the 10th, and the other failed; the shoots were a little stronger than those of No. 1. No. 3, eight plants started before May 4th, one on May 12th, and the other three failed, and, although at first the shoots looked well, they afterwards declined, and on September 15th they were feebler than those of No. 2.

"Second Year.—No. 1, fine vegetation; shoots strong and regular on the 15th of September. No. 2, good growth; shoots irregular, and a little feebler than those of No. 1. No. 3, growth mediocre; shoots very irregular, some roots having eight or ten, but all feeble; another plant died after having produced two stems.

"Third Year.—No. 1, growth magnificent: stems measuring on the 10th of May from 2 in. to 3½ in. in circumference. No. 2, growth passable, but irregular; some tufts small and weak; the finest had shoots on the 10th of May, not more than 2½ in. in circumference. No. 3, growth very middling and irregular; some tufts gave off shoots no bigger than quills, and the best reached little beyond 1½ in. in circumference.

"Fourth Year.—No. 1, growth remarkable; the shoots appeared from the 3rd to the *10th* of April, some as much as 4 in circumference; they afforded fifty shoots, which formed a bunch weighing more than 6½ lbs. No. 2, growth passable, but a little later than that of No. 1, and with plenty of small shoots; fifty made a half-bunch, weighing little more than the half of that cut from No. 1. No. 3, vegetation poor, one plant not starting till the 22nd of April; fifty shoots formed only half a bunch, and did not weigh more than 2½ lbs.

"To resume, it will have been seen that the plantation formed with plants a year old gave at its fourth starting, or at the end of three years of plantation, a bunch of Asparagus twice as large as that of either of the others. In other terms, the plantation made with plants a year old produced double that of the one where two-year-old plants were used, and nearly treble that made with plants of three years old."

**Cutting.**—Asparagus should not be cut till the second year after planting, and then only sparingly. By allowing the plants to get well and firmly established before making a very free use of the knife, and with judicious after-treatment, they will produce excellent crops for many years; at no time cut too severely, but bear in mind that the more copious and healthy the foliage during the summer, the stronger will be the produce next spring. As the strength of the roots depends on the quantity of foliage, there must be shoots enough left to maintain them healthy and vigorous, and to replace and store up for the following season sufficient matter for the healthy action of the plants. It is not advisable, however, to cut away the strong shoots and leave the smaller ones: quite the reverse—allow some of the finest shoots to grow. After the first fortnight's or three weeks' cutting is over, remove any small spray that may appear; for a few strong shoots to each plant, properly exposed to light and air, will be more valuable than any quantity of small ones. In cutting, a little of the soil is removed from the necks of the shoots with the Asparagus knife, which is then pushed down, carefully avoiding injuring the crown or other shoots that may be pushing up. When the knife is at the base of the shoot, give it a slight twist towards, at the same time pressing it close to, the shoot; then draw it gently upwards, by which process the shoot is separated from the plant. The knife generally used in this operation has a rough or saw-like edge, set to cut only one way, and that by pushing down. It should always be kept sharp at the three or four first teeth from the point. For those who are fond of natural unbleached "grass," any kind of knife will do, and in genial growing weather the heads may even be broken off without a knife. Asparagus for market is generally blanched by the earthing-up system, which is done by covering the crowns with a few inches of light soil, generally taken from the space between the rows, by which process we obtain the white bleached or blanched shoots daily seen during the season in the London market. When this method is adopted, the shoots must be cut below the surface *just as it appears* above ground. This mode, however, is not to be *commended—the right* way being, not to practise the earthing-up system, but to wait till the shoots are 6 in. above the ground, when they may be cut over almost level with the surface. By so doing we obtain the Asparagus in its green and natural condition and of exquisite flavour, to which the blanched can bear no sort of comparison. The cutting season should cease about the middle of June, and in no case should it be continued after the end of that month. When green Peas can be had, Asparagus is less required; therefore it is desirable to discontinue cutting after the 10th or 15th of June.

**Forcing.**—There are several ways of forcing Asparagus, all depending on the same principles, yet each adapted to a different kind of garden. Some are expensive, others not at all so, where stable manure is plentiful and garden labour not a scarce commodity. Thirty years ago in the London market-gardens a large forcing grower would purchase an acre or more from the plant grower, and send for it as his beds were made. At that time heating hothouses or pits of any kind by means of hot water was of course unknown. They employed a great number of common garden frames. A trench a foot or so wider than the frame and 15 in. deep was then cast out, and in this was placed about 2 ft. of London stable manure, and on this again a few inches of the rich friable earth of the old market garden which had been cast out of the trench, to secure the heat from evaporating. Then, soon after the frames were placed in a straight line on the hotbed, the plants were very carefully placed on the soil in the frame, covering them immediately with 3 in. or 4 in. of soil, or more if the Asparagus were required blanched throughout. If wanted quite blanched, of course air and light were not admitted. Every twenty-four days or so a fresh set of beds was made to keep up the supply.

Forcing may be commenced in November and continued till Asparagus is fit to gather in the open air. One of the best ways is to make a slight hotbed with stable manure, leaves, tan, etc., (these last materials, if easily obtained, will do well to mix with the manure,) in a Melon pit, or under a common Cucumber frame about 2½ ft. high; and on the surface of the bed should be placed a few inches of light soil, leaf-mould, or sifted potting refuse, on which to place the plants, because such material does not act so effectually in repressing the heat as ordinary garden soil; and when the roots are taken up as completely and carefully as possible and placed thickly on this, they should be covered with a few more inches of the same material. If the Asparagus be required of its natural colour—and that is unquestionably the best way to enjoy it—give the frame full light and air when fine. Water occasionally with tepid water. After one good watering in the early stage, a little will afterwards suffice, for the winter crops at all events, as the slow evaporation of the period and the natural moisture of the bed will preserve the soil in a sufficiently moist state. The heat of the bed must be preserved when it gets low by a lining, in the usual old-fashioned way, and by covering closely with mats or litter at night in cold weather—that is, if it be a common frame, but if in a brick pit this will not be necessary. The chief point is to be patient at first, to let it get a slow start, and not to be over-excited at any time, or it will start away and produce nothing but very weak, spindly shoots: whereas, by bringing it on gradually and regularly, a really respectable cutting may be obtained.

It is also frequently forced by being placed on the floor, or on a bench or pit of some kind, in an early vinery or other forcing house; and, whenever there is space to spare, and the heat is brisk and genial enough, this plan is good. Another very important way is by bringing the heat to the roots, and certainly by this plan a more permanent and stable kind of "grass" is obtained, because plant or root is not in the least disturbed. But it is an expensive way, though simple. The beds are in the first place very well made of rich, deep soil, and the alleys of these beds are dug out to a depth of 3 ft. or so, and then bricked: or, in other words, the Asparagus beds are made between low brick walls, perforated with "pigeon holes," to admit of the heat entering freely; and whenever forcing commences, the bricked trench on each side of a bed is filled with fermenting manure, covered over by a rough shutter, and the beds themselves with small wooden frames made to fit: these are, of course, only placed on during forcing, the beds being exposed in the summer season. The beds should not be more than 4 ft. or 5 ft. wide, to admit of the ready percolation of heat. This method is, however, only suited for places where a good deal of expense is devoted to the garden; and the modification or improvement of it, which consists in having hot-water pipes passing between each bed and the chamber covered with a slab of stone, is a much more expensive one. No matter what system is employed, a steady heat of from 60° to 65° will be found most suitable.

Another way of heating the beds is by means of hot-water pipes. This is a modification or improvement of the last mode, and is the same as is practised in the Royal Gardens at Frogmore. It is certainly a very expensive method; yet it must be admitted it is the most satisfactory in the end. At Frogmore the beds are about 75 ft. long and 7 ft. wide, their sides being built with brick, "pigeon-hole" style. The spaces between the beds are 4 ft. deep, the lower 2 ft. being filled with rich soil; and in the upper 2 ft. are flow and return hot-water pipes connected with a boiler that heats six such ranges. On the tops of the beds are frames. In special severe weather the sashes must be covered with mats or litter.

**Culture in France.**—Asparagus is grown much more extensively and to a much larger size in France than it is in England. The country is almost covered with it in some places near Paris; small and large farmers grow it abundantly, cottagers grow it,—everybody grows it, and everybody eats it. The system of culture is so essentially different from ours, and so successful, that it is desirable to make it fully known. Near Paris it is chiefly grown in the valley of Montmorency and at Argenteuil, and it is cultivated extensively for market in many other places. About Argenteuil 3,000 persons are employed in the culture of

Asparagus. It is grown to a large extent among the Vines. The Vine, under field culture, is simply cut down to near the old stool every year, and allowed to make a few growths, which are tied erect to a stake; they do not overtop the Asparagus in any way, but on the other hand the strong plants of that show well above the Vines. It is not planted in distinct close lines among the Vines, but widely and irregularly. They simply put one plant in each open spot, and give it every chance of forming a capital specimen; and this it generally does. When the stems get large and a little top-heavy in early summer, a string is put round all, so as to hold them slightly together (the careful cultivator uses a stake), and the mutual support thus given prevents the plant from being hurt by wind in its prime. We all know how apt it is to be twisted off at the collar by strong winds, especially in wet weather, when the drops on every small leaf make the foliage heavy. The growing of Asparagus among the Vines is a very usual mode, and a vast space is thus covered with it about here. But it is grown in other and more special ways, not one of these being like our way of growing it, which is decidedly much inferior to the French method.

Perhaps the simplest method, and the most worthy of adoption, is to grow it in shallow trenches. I have seen extensive plantings that looked much as a Celery ground does soon after being planted, the young Asparagus plants being in a shallow trench, and a little ridge of soil being thrown up between the lines of Asparagus. These trenches are generally about 4 ft. apart. Here, for instance, is a young plantation planted in March. In England, the Asparagus would be left to the free action of the breeze, but the French cultivators never leave a young plant of Asparagus to the wind's mercy while they can procure a bit of a stake about a yard long. But when staking these young plants they do not insert the support close at the bottom, as we are too apt to do in other instances, but at a little distance off, so as to avoid the possibility of injuring a fibre; each stake leans over its plant at an angle of 45°, and when the plant is big enough to touch it or be caught by the wind, they tie it to the stake. The ground in which this system is pursued being entirely devoted to Asparagus, the stools are placed very much closer together than they are when grown among the Vines—say, at a distance of about a yard apart. The little trenches are about 1 ft. wide and 8 in. below the level of the ground—looking deeper, however, from the soil being piled up.

The young plants are placed in these trenches very carefully. A little mound is made with the hand in each spot where a plant is to be placed, so as to elevate the crown a little and permit of the spreading out of the roots in a perfectly safe manner. In fact, they seem to be about as particular as regards depositing the young plants in the first instance, as a good Grape-grower is about his young Vines. They plant in March and April, using any kind of manure that can be had, but chiefly here, so far as I could see, the refuse of the town—the ashes, old vegetables, rags, and other matters, that the people throw before their doors, and which the dust-carts take away in the morning. They are very particular to destroy weeds, and they also take good care to destroy all sorts of insect enemies in the mornings, especially during the early summer. Between the lines of Asparagus they plant small growing crops on the little ridges during the first years of the plantation, but are careful not to put the large vegetables there, which would shade and otherwise injure the plants. When they plant, they spread a handful or so of thoroughly rotten manure over each root, and they repeat this every year, removing the soil very carefully in the autumn down to the roots, putting on them a couple of handfuls of rotten manure, and spreading the earth over again, so that the rain is continually washing nutriment to the roots. When doing this, they notice the state of the young roots, and where a plant has perished, or has done little good, they place a stick, and replace the plant the following March. Early every spring they pile up a little heap of fine earth over each crown. When the plantation arrives at its third year, they increase the size of the little mound, or, in other words, a heap of finely pulverized earth is placed over the stool, from which some, but not much, Asparagus is cut the same year, taking care to leave the weak plants and those which have replaced others, to themselves for another year.

They cut the best of it when it is about 1½ in. off the ground. Let us hear the French side as regards blanched Asparagus :—" In certain localities they do not yet value the distinction between blanched and green Asparagus, and occasionally prefer the latter. That is an error very prejudicial to the consumer's interests. In the green Asparagus there is only the point edible: in the white it is often entirely so, and, moreover, it is infinitely more tender and delicate. All Asparagus cut when it is green is not fit to be eaten in the ordinary way, but may be used cut up small as an accompaniment to other dishes. To serve up green Asparagus is to dishonour the table! In the markets of Paris the green Asparagus is worth one franc a bunch when the blanched is worth three francs; they do not eat it (the green Asparagus)—it serves for the manufacture of syrup of Asparagus."—*V. F. Lebœuf.*

When the plantation reaches its fourth year, the little mound of blanching earth is increased to 15 in. in height, for then they expect to cut something worth while, and these mounds are made in the early part of March; and even after this, as they grow stronger the little mounds are increased, and they always keep a look-out for the feeble plants, with a view to replace them. To have Asparagus as it ought to be, they say you must cut every day, or every two days, according to temperature, so that it may be obtained at the right moment; indeed, if they do not do this, the shoots become too high and too green. They place great importance on obtaining strong and healthy plants; and in the establishments which I visited they have three kinds—l'Ordinaire, La Hollande Tardive Improved, and La Hâtive d'Argenteuil. The first is described as very fine, the second very strong, and the last is the earliest, most productive, and best. Of course there are various modifications of the plan just described, and in several instances I saw two rows placed in a rather wide trench in an alternate manner. As to the size and quality of the Asparagus produced by this method there can be but one opinion.

Concisely: the French mode of cultivating this delicious vegetable differs from our own diametrically in giving each plant abundant room to develop into a large healthy specimen, in paying thoughtful attention to the plants at all times, and in planting in a hollow instead of a raised bed, so that as the roots grow up they may have annual dressings of enriching manure. They do not go to great expense in forming a mass of the richest soil far beneath the roots, but rather give it at the surface, which is consistent with the nature of the roots.

The French mode of forcing Asparagus chiefly consists in digging deep trenches between beds planted for the purpose, covering the beds with the soil and with frames, filling in the trenches between the beds with stable manure, and protecting the frames with straw mats and litter to keep in the heat. In the beginning of November the pathways between the beds of Asparagus are dug up about 2 ft. deep, and as much wide. Divide the soil coming from the pathway very carefully, and put about it 8 in. thick of the surface of the bed. Fill up the trench with good new horse-manure, and place frames on the bed. The manure should rise as high as the top of the frames, and the lights be entirely covered with mats and litter, to prevent the heat accumulated in the frame from escaping. About a fortnight or three weeks after, the Asparagus begins to show itself on the surface of the bed. Many market gardeners cover the whole of the bed inside of the frame to a thickness of 3 in. or 4 in. with manure, to force the vegetation more quickly, but in this case the manure must be removed when the Asparagus begins to shoot. When the shoots are about 3 in. out of the ground they may be cut. The mats must be taken off in the daytime, but the heat must be well kept up, or the roots and buds will fail to push. The beds are forced every second year only. The gathering of the Asparagus may continue for about two months, but no longer, or the plantation would be injured. When the gathering of the Asparagus is over, the frames and manure linings are taken away, and the soil which has been dug up from the alleys is put back again. The preceding applies to the forcing of the better qualities of Asparagus chiefly. A speciality is made of forcing the smaller-sized Asparagus. It is in the garden of M. Caucannier, Place de l'Eglise, at Clichy, and a number of iron houses are there devoted to the culture. Indeed, if I mistake not, those in the Jardin Fleuriste are copied from them. There are frames within each house, just as in many propagating houses in England, and beneath them the Asparagus is forced for the markets, and in *large quantities.* The houses are heated by hot water, and *the culture in other* respects resembles that which is practised in *forcing gardens in England*—that is, when the plants are taken to be forced indoors or in pits. The disturbance weakens the roots a good deal, and by this method the large table Asparagus is never forced. M. Caucannier and other growers produce it specially in a small state for soups, etc., but it is impossible to obtain in this way the large table Asparagus.

**Mr. Niven's Method of Culture.**—Mr. Niven has for a long time cultivated Asparagus with such success at Drumcondra, near Dublin, that we have thought it well to give his method of culture:—

"Any time during the winter or spring choose any portion of the surface of your garden with an open south exposure; it matters not much what the soil may be on which the plantation is to be placed—provided the surface-water, in winter, does not stagnate on or about it—but a soil of sandy quality is always to be preferred where it can be obtained; but where not to be had, it is easy to add a few loads of sand in the surface preparation. Having fixed upon the space to be occupied, a layer of half-rotted leaves, or rotten hotbed manure, may be spread over the whole, about 3 in. thick, to which might be added, where it can be obtained, a stratum of seaweed. This, during the winter, should be slightly dug into the ground, leaving the surface in narrow ridges, to receive the action of the weather; or, it may be done immediately before planting in spring: the former time of preparation is, however, preferable.

"About the end of March or beginning of April (or even in May, when the young heads are 6 in. or 8 in. high), choose a dry day, and have the ridged-up surface neatly levelled down, after which slightly dig the ground over again, which will thoroughly mix the surface with the manure and sand first applied; then tread over the whole regularly with the feet, and proceed to mark off, with the measuring rod, the places for the intended lines, at 4 ft. apart, studying to run them as nearly north and south as possible, marking the place of each line with the corner of a draw-hoe, as for Peas. This being done all over the plot, at the distances described, have a quantity of compost ready, such as one-third rotten leaves or rotted manure, one-third fresh soil (a hazel-coloured sandy loam from the corner of any grass-field is best), and one-third river or sea-sand. If this have been for some time previously prepared, so much the better. Along each drill or line lay a small ridge of the said materials. Choose, if possible, good strong two-year-old plants, a quantity of which may always be kept in a reserve seed-bed for successional plantations in any odd corner of the garden. As it is of essential importance that the roots should be as little exposed as possible during planting to a drying atmosphere, it may be best to proceed thus: carefully lift the plants, and cover them over in the barrow or basket with a little sand; proceed to set them on the little ridge or saddle prepared for them, as a man sits upon horseback, at about 6 in. apart from each other, having a person to follow with a barrowful of sand, which, with the spade, he lays over the roots and crowns, about an inch thick, observing to tread successively both sides of each line as he proceeds, with one foot, to firm the sand to the plants, so as to secure them from the action of the air until the process of planting is concluded, when a second and final covering of about 4 in. of the compost is to be put over the ridges or lines, which is to be firmly trodden to the line of plants as before. A small portion of the original surface between may then be thrown up with the spade, right and left, pressing neatly between every two lines as you proceed, and the process of planting, which is exceedingly simple, is finished. A plantation so made, containing from 140 to about 200 square yards, and requiring from 700 to 1,000 plants or so, would be sufficient to supply Asparagus during the season for any ordinary family—the expense of which, apart from the plants (which might be about 2s. 6d. per hundred) would be a mere trifle, particularly where sand and leaves or rotten manure can easily be had. I may remark that I much prefer the single line method of culture to beds, chiefly on account of the greater facility in the subsequent management, and because the plants derive more equal nutriment from the artificial surface that is gradually forming. The produce of two rows so treated I have found fully equal in quantity to any one bed with three lines, besides being much superior in quality.

"Summer treatment is an important matter in Asparagus culture. The plantation being finished, as has just been described, a good watering or two, should the weather be very dry, would, towards May, be advisable. In May, when the short grass mowing begins, a portion of it is to be brought to the Asparagus lines, and shaken in between, quite to the necks of the plants—say, so as to fill up the hollow spaces between nearly level. The object of this application, which must be renewed about once every month during the summer, will be at once evident—namely, the retention of moisture, and the production of vegetable food; and the slight fermentation that accompanies the decomposition greatly accelerates the growth of the plant; besides, ultimately a bed of the purest vegetable matter is formed, into which, on both sides, the succulent roots of the Asparagus plants run freely. In this way, from the proximity of the roots to the surface, the genial influences of solar heat and due atmospheric action are enjoyed by the plant, without the least danger of its ever suffering from drought, in consequence of the non-evaporating nature of the vegetable mulching or covering alluded to, which receives and retains, as a sponge, the greater portion of the moisture that falls upon it; whereas, in the common Asparagus bed, the surface during the dry part of the year is almost completely exposed to the action of the sun and air, and, during any continuance of dry weather, may be seen to crack or rend in every direction, to the destruction of the roots in numbers of instances. After the shoots have begun to come up, we immediately begin to look regularly and carefully after the thinning. When the plants have pushed two or more heads each, the weakest are regularly cut away, as the stronger heads appear; so that by the end of the first season, not more than two, or at most three shoots, are left to grow to maturity on each plant. Proper attention to the thinning of Asparagus in the first instance, immediately after planting, during the first and second years and afterwards, also in cutting for use, is of essential importance to the future welfare of the plant. In consequence of proper attention not being paid to the subject of cutting, arising either from carelessness of the consequences or from over-anxiety on the part of the gardener to send to table a good dish, much evil ensues to the plantation; for, frequently, instead of leaving a sufficient supply of strong shoots regularly over the bed, they are all cut away, and the weakest left—the inevitable result of which is a supply of comparatively small buds for the crop of the year following.

"In November, or as soon as the tops of the Asparagus become yellow, the whole should be cut over, and the soil along the crown of the ridge or line cleared away a little with the hand, when about 4 in. of sea or river sand should be laid along over the line of plants—this chiefly for the purpose of providing against the depredations of slugs in spring, and facilitating the clean free progress of the heads the next season. In the spaces between the lines, a few barrowloads of rotten manure, leaves, or seaweed may be laid, and the whole should be neatly levelled with a three-pronged fork, stirring up the surface between the lines very slightly, as the levelling of the fresh material proceeds. No further care will be required till spring, when, just as the first heads begin to appear, the whole may be slightly stirred on the surface, and over the lines a little of the sand raked off. The process of mulching with short grass, or, instead of it, other vegetable or decomposing animal matter, is to be followed up, as already described, from year to year. The second year some of the thinnings may be fit for use, but by no means should any of the strong heads be cut for that purpose, except where there are too many to one plant, as the patience and forbearance now exercised will be amply repaid by the produce next year, when the crop may be regularly cut for use. In gathering Asparagus, a habit prevails of cutting the heads a few inches below the surface; but for what useful purpose I am at a loss to conceive, inasmuch as the white or blanched part of the 'grass' is usually so hard and stringy as to be scarcely fit for use; whereas, by allowing the heads to grow the proper length above the surface, say about 8 in., they will not only still be compact, but the whole of the 'grass' will be tender and eatable."

**Asparagus Pests.**—Foremost amongst the causes which tend to diminish the yield of Asparagus deserve mention the luxuriant growth of fungus on the part of the plant above ground, the attacks of wireworms on its roots, and the depredations of the Asparagus beetle (*Crioceris Asparagi*), which abounds more in some seasons than in others, and is sometimes very destructive in one locality and almost unknown in others. The larvæ feed upon the leaves, perforate the buds, and even gnaw the rind of the stems. When the beetle first appears it may be controlled, but if it become established *the task is hopeless.* Whenever the eggs or the larvæ appear, cut and burn the plants as long as any traces of the insect are visible. The larvæ, beetles, and eggs are generally found from the middle of June to September; its larva state continues only for about ten days, after which it descends into the earth to undergo its changes; and in three weeks the perfect beetle is formed, when it ascends the plants to deposit its eggs. The beetle, after eating into the vegetable, lays its eggs in the tender juicy portion of the stalk and leaves, and when the larvæ (the produce of the eggs) issue forth, they totally destroy those parts of the plant with which they come in contact. The most efficient plan of dealing with this insect-plague is to collect and "stamp out" the young brood, or better still, the full-grown beetles, before they have laid their eggs. The work of collection must, however, be carefully proceeded with, for with the slightest movement the beetles will fall down and conceal themselves in the earth. After a time they reappear, and, if permitted, will crawl again on to the plant, lay their eggs, and recommence feeding. In his war of extermination with the beetles, the Asparagus-grower has no better friends and allies than the birds. If he be wise, he will do all in his power to attract and protect them.

Respecting the fungus, the first symptoms are observable in August. Small dark-brown spots, which in a few days attain the length of nearly a quarter of an inch, appear on the stalks, and gradually assume a much darker shade. These spots are surrounded by the ruptured epidermis of the stalk, and are somewhat inflated. On close examination, vertical layers of small powdery spots are remarked under the epidermis; and it is their great accumulation here and there which causes the latter to burst. The injury done to the parts of the vegetable that are above the ground has an unfavourable effect on the roots, checking their development; and in the ensuing spring the yield of Asparagus will be found materially diminished by the premature death of many of the plants. As to the precise nature and proper designation of the disease, whether rust or another disease greatly resembling it, whether originating in (or greatly increased by) over-manuring with nitrogenous fertilisers, and whether—as some maintain—never met with under the shade of trees, are questions on which uncertainty prevails. Should it be ascertained on further investigation that the disease is not confined to Asparagus—and Dr. Birnbaum has noticed a parasitic fungus almost identical in appearance on Couch Grass—the difficulty of combating the evil and preventing it from spreading will be proportionally increased. If it turn out to be rust, the spores alluded to are possibly the winter spores, which first develop themselves in spring on another plant, and are afterwards found on Asparagus in the form of mycelium or spawn. On one point—viz., the dangerous character of the disease—there is unfortunately no room for doubt; and the grower has every reason to be careful that it shall not gain ground, or be imported into districts hitherto free from it. Above all things he must endeavour to prevent the discharg of the spores—the organs of reproduction—and, as soon as any signs of disease show themselves, his best course is to remove the parts attacked and burn them.

Wireworms are sometimes very destructive to the roots of Asparagus, but by means of dressings of salt, pieces of Carrots or Potatoes attached to a skewer, and buried a few inches in the ground near the crowns, they may be attracted and destroyed; these decoys should be examined once every two days or so. Snails and slugs often attack the plants in mild springs, just as they push through the soil; but they may readily be got rid of by dusting the ground with lime.

**Asparagus Growing by M. Guiheneuf.**—Imported Asparagus, as may be seen in early summer in Covent Garden, is cut as soon as the heads appear half an inch above the ground, in order to keep the purplish colour of the top intact, which gives it so much more value; whilst English Asparagus is seldom used before it shows a green head 1 in., 2 in., or sometimes even 3 in. long, the flavour of which is, of course, much more pronounced. If, however, French market gardeners left their Asparagus one or two days longer in the bed, they would have specimens similar in appearance and flavour to English Asparagus. The taste, indeed, of these long, green Asparagus heads is always bitterish, and not so refined as that of the purple ones, and if the edible portion increases at the top it decreases at the bottom. There is but one sort of Asparagus, of which all others are varieties. The common Green, White, German, Grayson's Giant, Giant Purple Dutch, Battersea, Gravesend, Early Argenteuil, Late Argenteuil, Reading Giant, Conover's Colossal, etc., may all be obtained from the same sort after a few years' careful cultivation. Miller says he tried comparatively seeds of the wild and cultivated Asparagus, and always found a noticeable difference between the two; but it is to be feared that he did not pay sufficient attention to the matter. The Giant Asparagus so much praised is simply the result of many years' careful selection, and it is certainly superior to the common sort. In fact, if both be planted in the same bed and treated alike, the former will produce heads much larger than those of the latter, but after eight or ten years the common sort will for the most part have obtained the perfection of the improved kind, though many plants will always produce inferior heads. The fact is that in all countries and at all times unusually large Asparagus has been produced. Evelyn tells us that in England in 1699 he saw sixty Asparagus heads which weighed 15½ lb. Keysler says that in 1730 Asparagus heads produced at Darmstadt in Germany weighed ½ lb. each. Grayson produced a hundred heads which weighed 42 lb.; and as stated in *The Garden* (No. 238, p. 557), a bundle of Asparagus composed of sixty-two heads is said to have weighed 14 lb. 4 oz. Last year a hundred Asparagus heads exhibited at Colchester Flower Show weighed 15 lb.; the same grower had another hundred that weighed 18 lb.; and if all the fine specimens grown in private gardens round Paris were known to us we should have something still more marvellous. The length of Asparagus makes a difference in the weight, and ought to be noted. These examples show that Giant Asparagus can be obtained from any kind.

**Propagation.**—Asparagus is propagated either by means of seed or by division of the old clumps—the former being best: the latter is only used in the case of forced Asparagus. Many who raise Asparagus for sale care little about quality, consequently they use what seed they may have, whatever may have been its origin, and sell the seedlings at one or two years old—a practice encouraged by buyers who would object to pay a reasonable price for superior stock. The following mode of raising Asparagus will be found to be in every way successful:—Select the best plants in a bed not under six years old, and do not cut any heads of it the season in which seed is to be saved; allow the finest heads only to run to seed, and when ripe, select only the largest berries, avoiding the top ones; wash the seed out of the pulp, have a bed trenched 1 ft. deep in light, rich, well-manured soil, and on this sow the seed in January or February 1 in. deep in drills 1 ft. apart, and cover the bed with 1 in. of leaf-mould; five or six weeks afterwards the seed will come up; thin out the plants to 5 in. or 6 in. apart, and water them when necessary during the summer. The following spring these roots will be sufficiently strong to be transplanted permanently. Seeds are in some cases sown on the bed in which they are to remain; but that is not good practice, as it does not allow the seedlings to be selected and well cared for, and moreover the ground is in use one year earlier than it otherwise would be.

Asparagus grows best in a rich, sandy, fresh soil; if too calcareous or clayey, it does not answer. It also dislikes stagnant water, which must be drained off, and it requires more manure than most plants. It used at one time to be a luxury to have a bed of Asparagus, so expensive was it in the preparation. The bed used to be dug 5 ft. and 6 ft. deep; faggots of Broom or Furze were put at the bottom 1 ft. and 2 ft. thick; then the soil was replaced; after being mixed plentifully with manure, the roots were planted. The result was that such beds lasted from thirty to forty years in good condition, instead of from ten to fifteen, as they now do. Every one has his own mode of planting. In France, the general practice is to trench the bed 2 ft. deep, removing entirely 1 ft. of the soil, and laying it in a ridge beside the bed. Plenty of manure is then added to the remaining soil; the roots are planted 2 in. deep and 1 ft. apart, in rows 1½ ft., as under; and every year a layer of manure, and 1 in. in depth of the surrounding soil, are thrown on the bed, so that when the bed is made level the roots are still sufficiently deep. During the third season a few heads are cut. London market gardeners plant the roots 1 ft. or 1½ ft. apart, in rows 2 ft. or 2½ ft., as under. The beds, which are 3 ft. wide, consist of two rows, each bed being separated from the other by a footpath or alley 2 ft. in width. Every year the soil of the footpath is thrown over the bed, and autumn, immediately after the dry stems are cut down, the soil is again taken off the bed and thrown into the alley. Under this system Asparagus of a medium size can only be obtained.

**Large Asparagus** may be secured as follows:—Select a piece of ground for the beds of good quality; trench it thoroughly 2 ft. deep, carefully removing stones, roots, and anything else which may be injurious to the roots; mix with the soil plenty of manure or compost, and let it lie until the spring. In February, should the weather be favourable, form the ground into ridges 4 ft. wide and 1 ft. high, and in March or April, according to the weather, make a trench between each ridge a few inches deep, and plant on little hills or elevations 3 ft. apart, cautiously spreading out the roots, and covering them with 1 in. of good compost; then add an inch of fine soil. A stick should be inserted to protect the roots, and to which the small stems can be fastened when they require support. Keep the ground clear of weeds, and destroy all slugs, snails, and Asparagus beetles; the latter lays its eggs on the stems, and when the larvæ are hatched, they destroy the young plants. Hoe the ground over as often as may be required, and water two or three times during the summer with liquid manure if needed; never intercrop with any other vegetable. In the autumn, when the stems have withered, cut them down to 1 in. or 2 in. in height, and remove the soil from the roots, leaving only about an inch or so of covering, and put a layer of old manure or compost from 3 in. to 5 in. in depth over the roots. Thus covered, the roots will never get injured by frost.

*Second Year.*—In February or March fork up and level the bed, leaving the roots about 5 in. or 6 in. of covering, or make small hills 5 in. or 6 in. high over each plant. Make good any plants that may have failed, and cover the whole bed with a layer of rotten manure or compost 3 in. or 4 in. thick; this will keep the soil in good heart, and in an equable state as to moisture, therefore no more watering will be required; destroy weeds and insects, and tie the stems to their sticks in order to prevent the wind from shaking the roots. In autumn cut down the dry stems to a few inches above the ground; again make up the ridges, leaving the roots 1 in. or 1½ in. deep, and over all put as much manure as you like.

*Third Year.*—In February level the ground as in the preceding spring, and remove what was left of the stems; over each plant put a little hill of soil, and sticks will be no longer wanted, as the stems will now be sufficiently strong to resist the wind without support. A few heads may this year be cut for use from each plant, but cutting must not be continued later than the 15th of June. Every year, in autumn and in spring, the same operations must be gone through as in the preceding season.

*Fourth Year.*—All the heads may now be cut for use, but be careful to discontinue cutting on June 25th; after that allow all the stems which appear to run up. The roots having now attained ull development, must be kept during spring 10 in. deep, consequently the hill of soil over each plant must be made accordingly. The cutting time being over, the bed may be levelled if preferred; every autumn apply plenty of manure, and every spring mulch between the hills with fresh manure, to prevent the soil from becoming hard. Salt dissolved in water and applied in spring will be found advantageous; but be careful about applying chemical manures, which often prove fatal to the plants. All seeds should be picked off as early as can be done; do not let them fall on the ground in autumn, otherwise a quantity of useless young plants will appear, to the detriment of the bed.

The distances at which the plants stand apart may appear too great, but wide planting is the only secret as regards getting fine Asparagus; besides, the number of heads produced are double, and their size three or four times larger than they otherwise would be—thus showing a large balance in favour of plenty of room. The celebrated Argenteuil Asparagus, so largely imported to Covent Garden, is grown in a way similar to this. It is a practice in some provinces in France to plant Asparagus in vineyards between the lines of Vines. In this case the roots stand at 3 ft., 6 ft., and even 9 ft. apart, and though the ground may not receive any manure for twenty years, the produce is large and the quality excellent. Planting among Vines is chiefly done in Burgundy. Immense quantities of Asparagus have been planted in several parts of France and Germany for market purposes; they are for the most part cultivated with the plough, and supplied with chemical manure; the result is generally good. In order to ensure success, take up the plants from their seed-bed with every possible care; throw away every one cut or broken, and use only such roots as have a healthy appearance, and strong, well-developed buds; do not expose them to the air; on the contrary, put them into a basket in wet Moss immediately they are taken up, and keep them there until they are planted.

**Cutting.**—Asparagus should be cut when the heads just appear, or when they are 1 in. or 2 in. above ground, according to taste; once a day is sufficient, or twice for those who like them white and very tender. It requires some practice to be quick at cutting. The straight French Asparagus knife is the most convenient, inasmuch as it does not spoil the young shoots below ground, which cannot be seen. Holding the knife in the right hand, follow the Asparagus until the blade touches the root; then cut and pull up the Asparagus, which must be held with the left hand. Where the quantity cut is small, the heads may be carried away at once, but market gardeners leave them on the ground and collect them afterwards. Asparagus can be kept for a few days buried in sand in a cellar, but it is neither so well flavoured nor so tender as when used as soon as cut.

**Forcing.**—*White Asparagus.*—For this prepare the ground and plant as usual *in beds 4 ft.* wide, consisting of two rows 2 ft. apart, *and plant the roots* 15 in. asunder, leaving from 24 in. to 30 in. *between each bed.* The three first years cultivate them as pre viously directed, and the fourth season they will be ready for forcing, which can be done from November onwards. Asparagus ought to be forced only every other year; therefore, plantations must be divided into several parts and worked according to the wants of the household. At the end of October, or early in November, the stems being cut down and removed, put on the frames; dig a trench from 1 ft. to 2 ft. deep between the beds, throwing the soil on to the bed, and put 1 in. of leaf-mould on the top; fill the trench with fermenting material up to the top of the frame, as for a hotbed, and cover with a wooden sash instead of a glass one; in case of frost protect with mats. The inside of the bed may also be filled with manure; but it must be removed as soon as the Asparagus makes its appearance, which will be from twenty to twenty-five days afterwards. Never give any air or light to the bed, and keep up the heat to about 60° Fahr., until the plants are exhausted, then take off the frame in the spring and level the ground.

*Green Asparagus.*—This is generally very small, quite green, and grows on a hotbed without earthing-up, its tops being cut and mixed with Green Peas. Young seedlings produce the best Green Asparagus, and in the neighbourhood of large cities immense quantities of roots are grown for that purpose. This mode of forcing is practised from October onwards to the spring. The bed being ready and the frames on, put 2 in. of mould or fine soil on the top, and cover with glass sashes. A distance of 1½ ft. is necessary between the bed and the lights. When the first heat is over and the bed reduced to 70° Fahr., plant the roots in a perpendicular position close by, with the tops all one height. In the case of old clumps, the roots must be shortened to a convenient length; insert some soil between them, and cover them with 1 in. of mould; put the frames on, and leave the bed alone until growth has commenced. Then admit plenty of air every day, if possible; keep the heat up, however, but not above the degree quoted. Cut the Asparagus as soon as it is sufficiently long until completely exhausted, when the roots may be thrown away. Owing to the dampness of the bed watering will be unnecessary. In case of sharp frost, cover with mats. Asparagus may be forced in this way, wherever there is heat in a hothouse, or in pits or frames heated by hot water; but the latter are too expensive for market gardeners, who have so much hot manure at their disposal.

## Bean, Broad

(*Faba vulgaris*).

The Broad Bean is a native of Egypt and other parts of the East, and is amongst the oldest of cultivated vegetables. There are many species in cultivation, the most general being termed *Mazagan, Windsor, and Long-pod*, which are the earliest kinds of Beans that can be produced out of doors, inasmuch as (being perfectly hardy) they can be sown at any time during the winter.

Broad Beans are not thought so much of in private establishments as Kidney Beans, owing to their being of a coarser character; but by the poorer classes they are much sought after. Generally they are not considered a very remunerative crop, inasmuch as they do not continue long in bearing. The green-seeded varieties are usually preferred to the white ones, because they retain their green appearance when cooked, whilst the white ones become dark brown—a colour to many very objectionable.

**Sowing and Planting.**—Years ago it was the practice to sow Broad Beans in October, November, and December for the earliest crops, but this is now seldom done; the plants are generally raised in pots, boxes, or frames, and afterwards transplanted to the open ground. This is undoubtedly the best plan, as the ground that would otherwise be occupied by the seed can be ridged or roughly dug, and exposed to the weather to get pulverized and freed from slugs, snails, etc. By adopting the method of transplantation, fuller and more even rows can also be ensured. The first sowing should be made early in January in a frame or pit from which frost is excluded, or a sowing may be made in heat in February and gradually hardened off after the plants are up. The plants should be grown stout and strong, and be in readiness for turning out early in March, provided the weather be favourable. A south border, under a wall or hedge, should be chosen for them if possible, and after planting, if planks or thin boards can be placed edgeways on each side of the rows, to protect them from cold winds, all the better. The rows should be planted from 2 ft. to 2½ ft. apart, and the plants in the rows should be 4 in. or 5 in. apart. This will be found to be room enough for early crops if dwarf varieties be grown. If the weather be favourable throughout the spring, the crop will be fit for use by the middle of June, which is as early as Broad Beans are generally expected to be fit for use. Successional sowings may be made in the open ground in January and February, and the principal sowings should be in March and April. If late crops be required, small sowings may be made as late as July; this is, however, seldom done. In order to obtain late crops some growers, after gathering the produce from the main or summer crops, cut down the plants to within a few inches of the ground, then give them a good watering, and in a few days they throw out young shoots which eventually furnish a fair crop of late Beans, though, of course, not so fine as the previous crop. Others sacrifice part of the summer crops, and cut down the plants just as they are coming into bloom: the produce from these is of course finer than that from plants that have previously borne a crop. Either of these ways is, however, preferable to sowing for late crops, inasmuch as the plants are hardier, and being well rooted stand the dry weather late in the summer and the cold in the autumn. By this method Beans of fair quality may be had up till late in November, unless the weather be unusually severe. *Sowings for successional* and main crops may be made on ope *quarters, or between rows* of Spinach or any other crop that w be cleared before the Beans get very high; the former, however, is best when ground can be spared. The seed should be sown in rows from 2½ ft. to 3 ft. apart, the Beans being placed about 4 in. or 5 in. apart, and they may either be put in with a blunt dibble, or drills may be drawn for them 2 in. or 3 in. deep. Previous to sowing main crops the seed should be soaked in water for a few hours to accelerate vegetation; but for early crops it is unnecessary, as the ground is generally moist enough to answer the purpose. Earthing up is advisable for early crops, for it affords a slight protection to the plants during cold, windy weather; but for other crops it is not needed. When the plants show sufficient bloom to produce a good crop, their tops may be picked out in order to enhance the setting of the blooms and development of the pods. Where tall varieties are grown some support should be given them to prevent their being broken by the wind. The best support is thick twine tied to strong stakes driven in the ground on each side of the rows. Long, slender sticks, tied to the stakes lengthways along the rows, will answer, but the plants are apt to get bruised against them when swayed to and fro by the wind.

**Varieties.**—Although there have recently been many new and valuable additions made to our lists of Beans, there are some of the older kinds that still unflinchingly maintain their position. The dwarf kinds of Mazagan are those generally grown for early crops, not because they are naturally earlier than the taller kinds, but because they can be grown in warm situations where taller kinds would not always be admissible, and can, therefore, be got earlier. Dwarf kinds are sometimes preferred for the smallness of the Beans rendering them more delicate-looking than some of the larger varieties. Of dwarf kinds Beck's Green Gem and the Dwarf Fan are two of the best: the plants assume a neat, compact habit, are abundant croppers, and good in quality; in this respect, however, Beck's Gem is preferable, on account of its green colour—that of the latter being a dullish brown. The taller kinds of Mazagan are not worth growing in comparison with the Long-pods and Windsors, but where small Beans are preferred, they answer the purpose. The plants grow from 3 ft. to 4 ft. high, and produce large quantities of pods 3 in. to 4 in. long, containing from three to four small Beans. The Long-pods are earlier than the Windsors, and are therefore preferable to them for first and second early crops. Of these there is no variety better than Johnson's Wonderful; it grows from 4 ft. to 5 ft. high, and is a splendid cropper, producing the green pods from 7 in. to 8 in. long, full of Beans that are not excelled in quality. Carter's Mammoth Long-pod is likewise a very excellent variety. The Green Long-pod is largely grown in private establishments, the colour of the Beans when fit for use being of a bright green. The Seville Long-pod is a variety of Broad Bean that has been for many years in cultivation on the Continent, especially in Spain, where it has done good service in the way of supplying food during times of war. It well deserves the high commendations bestowed upon it, and ought to be in every good garden. The true variety, however, is somewhat difficult to obtain; hence its introduction into English gardens is but slow. It is, however, an early and long-podded variety, and quite distinct from any other. Its pods are tender, and fit for use ten or twelve days before the common long-podded sorts. It grows moderately robust, with one or more slender stems, according to the distance at which the plants stand apart; its leaves are of a bright green colour, and its pods, three to six on each plant, are extremely long, measuring often 6 in. to 10 in. in length, and 1 in. broad; they are of a bright, fresh green colour, quite pendent, and contain from five to eight Beans, which are bright fawn-coloured, obovate, flattened, and the largest after the Windsor varieties; being rather more tender than other kinds, the seed should be sown in a warm, protected border, which should be slightly covered with rough litter in the event of frost. Being only a moderately-heavy cropper, and liable to injury by cold weather, it is not adapted for field culture in England, but as a garden Bean it is well worth attention. The Windsor is most suitable for main or late crops. The Improved Broad Windsor grows from 2½ ft. to 3 ft. high, and has pods 5 in. to 6 in. long, and 1½ in. broad, containing two or three very large Beans of excellent quality. This is a much esteemed sort. Hardy Pedigree is a good hardy sort, which much resembles the old Toker Bean. Green Windsor, Loxford Windsor, and a variety called Thick Windsor, are all good sorts, on which full dependence may be placed.

**Soil, Mulching, and Watering.**—A deep, well-drained, strong loam is most suitable for Broad Beans, with the exception of early crops, when the soil may be of a lighter character. Where the soil is too light it may be improved by treading it firmly whilst in a dry state, or planting without digging. If the ground in which Beans are to be grown has been manured for previous crops, it will be found sufficiently rich for them, as a very rich soil will produce too luxuriant a growth, which is inimical to the production of pods. During dry weather it is a good plan to give a good mulching of half-rotted manure between the rows of main crops of Beans to save watering, but it should be done before the plants are in bloom in order to keep the roots in a moist condition whilst the blooms are setting, this being highly necessary to the production of large full pods. Watering is seldom necessary for Broad Beans, if grown in a deep soil; where, however, the soil is shallow, it may sometimes be needed, in which case it should be thoroughly done and afterwards the ground should be mulched. Beans are often gathered for table before they have attained half their size; but this is not advisable, as they sometimes taste bitter when so small. The best-flavoured Beans are those that are full grown but young. If any be required for soup, a row may remain until they become black-eyed. When gathering for exhibition choose young, long, straight, and shapely pods, as nearly alike as possible, and the more Beans they contain the better.

***Broad Beans in Market Gardens.***—The Broad Beans which are usually seen in Covent Garden and other London markets come chiefly out of what are called the home counties. About Acton, and one or two other places near London, a few are grown for early purposes, convenience of cropping, or as a rotation crop; but otherwise they are not grown to any great extent close to London. The Early Mazagan, Broad Windsor, Green Broad Windsor, and the Long-pod are the sorts usually cultivated: and, as they are not a very remunerative crop, considering the great labour incurred in sowing, growing, picking, packing, and carting, before they are marketed, valuable ground is not occupied with them. Dry and light soils, in warm positions, are suitable for early sowings, which are commonly confined to the Early Mazagan, and made in January, and again in February, in rows 2½ feet apart, running across or obliquely in the borders or quarters. Large sowings of the Long-pod are made in the latter half of February and in March, in rows equally distant as for Mazagans, but with less particularity as regards the way in which they run, the position of the quarter, or the quality of the soil which they occupy. The Broad Windsor, which forms the principal crop, is generally sown in March. Although the common Broad Windsor constitutes the bulk of the main crop, yet the Green Broad Windsor is usually preferred by consumers when they get accustomed to it; therefore market gardeners generally grow the green sort.

Beans are sometimes sown at the distances above named on ground occupied with Radish beds, with the progress of which they interfere but little, as the Radishes are too small to injure the Beans, and they are sure to be removed before the latter can be in any way injurious to them. Early Stone Turnips are not unfrequently sown between the rows of Beans, and such spaces are also sometimes occupied with Cos Lettuces, Cabbages, Cauliflowers, or Brussels Sprouts in every second row, Lettuce being in the intervening one. The Lettuces, being soon ready for market, are removed, and thus make a good clearance for a free circulation of air, and a passage from which the Beans off two rows can be easily gathered. Market gardeners seldom save their own seeds, as they find it cheaper in the end to buy them. When seeds are to be saved, the haulm is allowed to occupy the ground a few weeks longer than it otherwise would do, and thus curtails the chance of cropping it with Savoys, late Sprouts, or Cauliflowers, early Endive, and a few other crops. As soon, therefore, as the Beans have entirely yielded their crop, the haulm is pulled up and carted to the manure heap. The ground is then dug, or ploughed, or deeply worked without being manured, and a crop of Endive or white Cos Lettuce is planted therein for use in October, or Savoys, Brussels Sprouts, Cauliflower, Broccoli, autumn Radishes, or transplanted Leeks, may be planted in it; or if it have been manured and deeply dug, it will be in good condition for a fresh Strawberry plantation. Some growers, however, grow Beans largely for seeding purposes only, and in this case about one-half or two-thirds of the pods, consisting of the earliest formed, are picked off for marketing in a green or usable condition, the remainder being left to ripen. If all were left, the seeds would not be so large, plump, or heavy as when the pods are thus thinned out. When the Beans have become well matured the haulm is pulled up, and laid on its side to dry for the remainder of the day, if fine; it is then tied into bundles, dried thoroughly, brought home, and either thrashed at once, or kept under cover or in a thatched stack until a more convenient season for thrashing out the seeds occurs. Coleworts form the chief succession to the seed Bean crop. Covent Garden Market is supplied with fresh Broad Beans from Algiers as early as April, and it is astonishing to see how well they bear their sea passage, and maintain their freshness until they arrive in London. France furnishes supplies soon afterwards, and maintains them until home-grown produce comes in.

## Bean, French or Dwarf

(*Phaseolus vulgaris*).

THIS is probably a native of Asia, and is cultivated in most countries; it forms one of the most valuable summer vegetables we possess, and, though largely grown in some places, it is not as a rule cultivated in such quantities as it deserves to be. An early sowing is generally made, in order to be able to pick Kidney Beans before it is possible to have those of the Scarlet Runner type in bearing; but as soon as the latter come in, French Beans are almost lost sight of. For small gardens the French Bean is invaluable as a summer vegetable, being easily grown, requiring no stakes, and being one of the most remunerative of vegetable crops. It may be had out of doors both earlier and later in the season than the taller-growing kinds, owing to its dwarf habit adapting itself to any situation—as for instance under hedges or walls, or other sheltered positions; it also comes into bearing much more quickly than Runners. As regards flavour, the Scarlet Runner has, perhaps, the advantage, but market gardeners round London know well the value of the Dwarf Bean, and many of them grow it by the acre. The value of French Beans for forcing, and for furnishing the table with a delicate vegetable throughout the winter cannot be overestimated; they may be easily grown where hot-water pits or forcing-houses exist, but where such conveniences are not at hand, any attempt at growing them must be abandoned. Some of the varieties of French Bean, commonly called Haricots, are allowed to ripen their seeds, which are dried and stowed away until wanted for use. These, when properly dressed, form a very desirable dish in winter when other vegetables are scarce. French Beans in their young state are extensively used for pickling.

**Sowing and Culture Out of doors.**—Where French Beans are grown in the open air without protection, it is impossible to have them fit to gather before the latter end of June or beginning of July, unless it be indeed an exceptionally favourable season

Where, however, they are sown in a warm, dry situation, and somewhat protected from cold winds and late frosts, they may be had fit for table during the second and third weeks in June. Where it is desirable to have Beans as early in the season as possible, it is a good plan to sow thickly under hand-lights in a warm corner, and then transplant—an operation that should be performed when the plants have made the first pair of rough leaves. After preparing the ground in which they are to be planted, which should be the warmest, driest, and most sheltered available, they may be carefully lifted with as much soil adhering to the roots as possible, and planted in rows 1½ ft. or 2 ft. apart, or in patches, whichever is most practicable; in either case the plants should be about 6 in. apart. If the planting be done early in the day they may receive a gentle watering to settle the soil round the roots; if otherwise, it will be better to leave them unwatered until the next morning. All possible protection should then be given them; if hand-lights be plentiful they are the best, in which case planting in patches should be practised, as the lights can be more easily placed over them; but small twigs of Laurel or Fir fixed neatly round them answer the purpose in the absence of anything better. Rough hay-bands stretched lengthways over the rows, about 6 in. or 8 in. from the ground, and firmly secured to stout stakes driven in the ground at each end of the rows, may be employed with advantage. A rough frame, made with sticks driven in the ground and others tied across them to admit of mats, straw hurdles, or any other protecting material being laid upon them at night, is also useful: but whatever is used to protect them, care must be taken so to place it as to avoid draughts as much as possible. Sowings for this purpose may be made in the beginning of April. If the weather be favourable, the ground in which early Beans are to be grown should be deeply dug and left rather rough. The next day when the sun is going down it should be again turned over with a fork, in order to turn the warm soil underneath and expose the cold to the next day's sun. If this can be done two or three days consecutively a great advantage will be gained. The last time on which the soil is moved it should be made fine on the top, to prevent the under soil again becoming cold. When the seed is sown where it is to remain, drills may be drawn with a hoe 2 ft. apart and 2 in. deep, and sufficiently wide to admit of two rows of Beans being placed 3 in. or 4 in. apart. The distance from Bean to Bean in the rows should be 8 in. or 9 in. Where, however, seed is no object, they may be sown much thicker and thinned out to the required distances apart, after they are up, by removing the weakest plants. In any case a few extra seeds should be thrown in at the ends of the rows to provide for filling up blanks, which often occur in early crops when the ground is cold and wet. The earliest sowing out of doors should be made the second or third week in April, if the weather be favourable, otherwise it is better to wait a little longer. It is not advisable to plant very largely for early crops, unless they are wanted in quantity; it will be found better to make two or three small sowings at intervals of a week or ten days during April: after that the principal or main sowings may be made until up to the middle of June, after which time a few smaller sowings for autumn use. The last sowing should not be later than the end of July, unless protection can be afforded the plants in the autumn. For principal crops the plants should be thinned out to 9 in. or 1 ft. apart in the row, the rows being 2½ ft. or 3 ft. asunder, according to the varieties grown. Earthing up the row is a point that has been much disputed, some growers being of opinion that it is beneficial, whilst others think the reverse. For early crops we should, however, strongly recommend earthing up, as it has a tendency to keep the soil around the roots in a drier, and consequently a warmer state than it otherwise would be; for the main crops, however, we would recommend rather deeper planting, and heavy mulchings in dry weather in preference to earthing up. Stopping the points of the shoots is practised by some growers; it is, however, immaterial for general crops, but in the case of early Beans, and those grown under glass, it is decidedly advantageous.

**Culture in Pits and Frames.**—The method to be adopted for growing Beans under glass must necessarily depend upon the nature of the structures in which they are to be grown. Where only cold pits and frames are employed Beans cannot, of course, be obtained during the winter months, but by a little attention and skill they may be had very late in the autumn, and much earlier in the spring than they can be obtained in the open air. If heating material, such as stable litter and leaves, be plentiful, sowings may be made in pits or frames early in March. If pits be used they should be filled up with heating material to within 2 ft. of the glass, firmly treading it down as the work proceeds. This done, a layer of rotten manure or leaf-mould may be spread over the litter to the thickness of 3 in. or 4 in.; 6 in. or 8 in. of soil may then be placed on the top, the lights put on and allowed to remain until the soil is found to have got warm, when the Beans may be put in rather thickly, eventually thinning out so as to leave the plants 6 in. apart each way. If the soil be dry, watering will be necessary, but too much moisture must be avoided at this season of the year. If a lining of warm manure can be put round the pit it will be beneficial to the growth of the plants. A thick covering will be necessary at night to protect the plants from frost. Where wooden frames or boxes are used, a good bed of leaves and litter should be made, and the box should be placed upon it, building the lining up round the box to the level of the lights, as is done in the case of Cucumbers and Melons. If treated afterwards as recommended for pits, the plants will grow rapidly—*i.e.*, if the weather be at all genial. When they have made two joints beyond the seed leaves, the points may be pricked out, in order to keep them dwarf and sturdy, and cause them to throw out stronger side-shoots than they otherwise would do. If a few small twigs be stuck in the soil between the plants, they will not be so liable to get broken. Abundance of air will be necessary when the plants are well established, but it must be given discriminately, as a rush of cold air suddenly admitted would cause the tender foliage to shrivel, and render the plants worthless. If it be found that too much steam accumulates in the frame during the night, it will be necessary to leave a "crack" of air on. Beans may be obtained in this way by the end of May or beginning of June, and, if properly treated, will yield a fair supply until the early out-door crops come into use. If, however, there be convenience, another sowing may be made in the same way a fortnight later, in order to insure a supply in the event of any disaster befalling the first out-door crop. Some growers prefer raising the plants in pots or boxes and transplanting them into frames, and where time can be spared this plan is not without advantages; others prefer growing them entirely in pots, and plunging them in the pits and frames. Thus managed they come into bearing rather sooner, but they do not generally last so long, neither is the produce so fine as from those planted out. Where there are pits heated by flues or hot-water pipes, good Beans may be produced throughout the winter by adopting the same mode of culture as that recommended in the case of cold pits, with the exception that linings will be unnecessary, neither will bottom-heat be needed; but where it is not used, growing in pots placed upon boards near the glass is preferable to planting out, as the roots are not then surrounded by such a bulk of cold soil. In order to prolong the Bean season. a sowing may be made in August in cold pits or frames; those lately cleared of Melons or Cucumbers will answer perfectly. It is, however, a good plan, previous to sowing, to choose a fine, sunny day, and give the soil a good soaking of water, and to wash well all the wood or brickwork with a syringe, after which close the lights and let the sun have full power on the glass; this will quickly put an end to any insects that may have put in an appearance. After sowing the lights may be left off night and day, until the coldness of the weather necessitates their being put on. A good, warm covering should be afforded during cold nights. By this means a good supply of Beans may be had until late in November, unless the weather be very severe. For this crop stopping the shoots is unnecessary, inasmuch as the plants will continue longer in bearing if left undisturbed.

**Culture in Houses.**—The best place for the culture of Beans is a span-roofed Cucumber or Melon-house, with a path in the centre and a bed on each side. The Beans may either be planted out or grown in pots; if the house can be entirely devoted to them, the former is undoubtedly the better plan, but it seldom happens, except in large establishments, that a whole house can be spared for Beans. Where, however, there is this convenience, the best way is to sow the first bed towards the end of September (if sowings have been made in cold pits, etc., to supply late crops), and another in the course of a month. By the time the plants from the second sowing come into bearing the first crop will be over, and should be at once removed, and another sowing made in its place; by this means a good succession may be kept up until Beans are plentiful out of doors. Where the house is sufficiently large to admit of three successional sowings, a more constant supply can of course be depended upon. It, however, often happens that the only house available for forcing Beans has also to be used for growing Cucumbers; where this is the case growing in pots is to be recommended, as they can then be readily removed from place to place as required. Beans associate well with Cucumbers, but they must not be shaded by them. They also succeed well in Pine-stoves or Pine-pits, when planted out along the front, where they can get the benefit of sunlight, or they may be grown in pots placed on shelves with considerable success. Shelves on the back of early Vineries, Peach-houses, etc., are also good places for Beans; but where these are the only convenient places in which to grow them, a crop cannot be reckoned on until early in spring, few houses of this description being warm enough for them before the beginning of January.

**Pot Culture.**—Beans are grown in pots in various ways: some raise the plants in small pots or shallow boxes, and then transfer them to large pots. This is generally done with the view of giving them a check, and thus inducing them to bear quicker than they otherwise would; but we doubt if such be the case. One thing is certain,—the produce is not so fine from plants treated in this way as from those grown on without a check. To get fine Beans we must first get fine plants, but it sometimes happens that all the available space for growing Beans is occupied by those in a bearing state; then, in order to get a succession as soon as possible, plants are raised in small pots because there is not room for large ones until such crops have been gathered. Where, however, it can be done, the most expeditious way is to fill the pots in which they are to remain about three-parts full of soil, put in the Beans rather thickly, deep enough to cover them; and when the plants have grown 1 in. or 2 in. above the rim of the pot, thin them out as required, and fill up with soil to within an inch of the rim. They should be well watered previous to earthing up, and then be allowed to get dry before watering again, for, if watered immediately after earthing up, the plants are liable to rot off. The most convenient-sized pots for Beans are 8-in. and 9-in. ones; smaller or larger will answer, but these sizes are generally used in preference to any others. Three plants will be enough to have in 8-in. pots; 9-in. ones may have four, and so on according to the sizes used. After the points have been picked out as previously mentioned, the plants should be sticked with small twigs, such as those from an old Birch broom; or if grown on shelves, they may be supported by pieces of twine strained from end to end on each side of them; if the shelves be against a wall, one string will be enough. Frequent syringing on sunny days will be necessary in order to keep the foliage clean and healthy.

**Varieties.**—These are now so numerous, owing to so many recent introductions having been made, that it is a difficult matter to say which kinds are really the best. Some varieties, although adapted for forcing, are unfit for producing general crops; whilst the best varieties for out-door crops are often comparatively worthless for forcing. The following are a few of the best for forcing or for the first crop out of doors; but they should be grown for those purposes only, as they are, both in size of pod and quality, much inferior to good second-early or main-crop kinds. Osborn's Early Forcing is a good variety of dwarf, compact habit, the pods of which, though small, are produced abundantly. Wilmot's Forcing is an excellent kind, a free bearer, and one which produces long pods of good quality; Syon House, Fulmer's Early, and Sir Joseph Paxton are also all excellent in every respect for early work. But for second-early and main crops, the following are some of the best:—Canadian Wonder, or Red Flageolet, a rather tall-growing kind, of sturdy habit, producing abundance of fine green pods 6 in. or 7 in. long, of excellent quality; Long-podded Negro is another good kind, but it does not bear so freely as the former; Victoria Dwarf, or Exhibition Dwarf, Cutbush's Giant, Carter's White Advancer, and Salmon Mexican. These are all good for general culture, and also for purposes of exhibition.

**Soil.**—French Beans like a light, rich, sweet soil; therefore if the ground do not already possess these qualities, good rotten manure or leaf-mould should be added. If worms abound, a good dressing of soot or lime should be given; and if this can be done in the winter, and the ground thrown into ridges or roughly dug, it will be all the better. For pots and beds under glass the soil should consist of three-quarters light turfy loam, and one-quarter decomposed manure or leaf-mould. Soil in which Cucumbers have recently been growing will generally answer well for Beans: in all cases a sprinkling of soot amongst it will be found beneficial. We have seen trimmings from the edgings of walks, chopped up and mixed with fresh horse-droppings, used for pot culture with the very best results.

**Mulching and Watering.**—A good mulching of Sea-weed or half-rotted manure from old linings, or litter from Vine borders, applied between the rows of all kinds of Kidney Beans that are grown out of doors, will be found beneficial in keeping the soil about the roots in a moist condition, and in promoting a free and luxuriant growth, which is highly necessary to the production of long supplies of fine, tender, and juicy Beans. Copious waterings will be necessary for all kinds of Beans, wherever they are grown, when they are coming into flower, if the weather be dry,—otherwise, instead of the blooms setting, they will fall off. Manure-water may also be advantageously applied after they are set, but not before, as it promotes so much growth, which is inimical to bearing. Guano-water may be given to those grown in pots with advantage; but it is no better than good manure-water from the stable-yard, or that made from cow-manure. Where, however, the latter is used, a little lime should be previously dissolved in it, otherwise it has a tendency to make the soil sour and breed worms. Water in all cases should be applied in a tepid state; and avoid pouring it close *to the bases of the stems,* as they may be injured by so doing.

**Gathering.**—This should in all cases be done as often as the Beans are fit for use, for if only a few be allowed to get old, the bearing properties of the plants will be impaired; therefore if seed be required, let a small sowing be made expressly for that purpose.

**Preserving Beans.**—If during the season there be a superabundance of Beans, they may be kept for winter use by cutting them up in the ordinary way and putting them in stone jars with plenty of salt. If the air be kept from them, they will come out fresh and green in mid-winter, and their flavour will not be much impaired.

**Beans for Exhibition.**—In gathering these care must be taken to have all the pods as nearly as possible the same length and age. They should be full grown, but young and brittle, choosing only straight handsome pods for the purpose If enough cannot be got at one picking, some may be gathered two or three days previous to their being wanted, and if their stalks be inserted in shallow saucers of water and kept in a cool place, they will keep perfectly fresh and green. If required to be sent any distance previously to being exhibited, they may be kept quite fresh by packing them in tin boxes between layers of damp Moss, Spinach, or Ivy leaves. During summer, leaves of the Ice-plant answer well as a packing material.

**Insects.**—*Slugs, Snails, and Red Spider* are the principal enemies of the Kidney Bean: the two former generally attack the young plants as soon as they are up, and whilst the leaves are young and tender; we have frequently seen sad havoc made by them in early crops of Beans. In old houses, too, they are generally to be met with: they will crawl up the walls and upon the shelves, and ruin a crop of Beans in a night or two. The most effectual remedy is to hunt them at night, after it is dark, when they may be found upon the leaves, bent on destruction. Lime, salt, and soot will prevent them travelling if it can be laid in such a manner that they cannot get at the plants without crossing it. Salt must not, however, be placed where rain or water can wash it into the roots of the plants. Red spider can only be kept in subjection by frequently syringing the plants overhead, giving plenty of water at the roots, and, in fact, doing everything calculated to promote free and vigorous growth.

**How French Beans are Grown for Market.**—Of all market garden summer crops this is the chief; for, when French Beans appear in the market, the demand for Cabbages, Cauliflowers, and Peas begins to decline, Vegetable Marrows being their greatest rivals. French Beans, however, always command a sale, provided they are good and fresh, and overstocking the market with them is almost a thing unknown; though when large quantities of them are introduced prices are materially affected. The valley of the Thames is perhaps unequalled as regards the growth of this crop, the soil there not being liable to excessive drought, and being made light and rich by much working and heavy manurings. As French Beans are short livers and gross feeders, they require manurial substances of such a character as can be speedily turned to account; therefore land that was richly manured for the previous crop—such as for Celery—and that has also been liberally dressed with short manure, such as that from Mushroom beds or old Cucumber pits, is usually chosen for them. Newington Wonder and Negro are the principal sorts grown in the London market gardens, and, although old varieties, are reckoned to be the two best. Their productive qualities are great, for when well attended to as regards timely picking of the pods they continue fresh, vigorous, and fruitful for a long time, and their pods, as a rule, are less apt to turn tough and unusable with age than is generally the case with other varieties. The Black Belgian has also found its way into the market gardens; it is a good, dwarf, early sort, much like the Negro, of which it is considered to be a variety. It is very useful for late sowings and for early framework. Some growers prefer the Newington Wonder to all other sorts; it is a very prolific, dwarf-growing sort. Other growers prefer the Negro, which they grow in frames, as their earliest, main, and latest crops; but most of them also grow the Newington Wonder. The first crop of French Beans is generally grown in frames, and those just cleared of Cauliflower and Lettuce plants are used for this purpose. The frames being already sufficiently filled with mould, it is pointed over with a spade, and the seeds sown—provided the soil be not cold and wet, which might easily be avoided by keeping on the sashes after removing the late occupants—in four rows under each light, and about 3 in. or 4 in. from seed to seed in the row. The middle of March is the common time for sowing in frames, and then the sashes are kept close till the seeds germinate, when they are tilted up a little at the back in favourable weather, but care is always taken to keep the sashes close in the case of cold winds, and to cover them over with mats or litter in the event of frost. As they advance they are treated more hardily, but judiciously, judging according to the weather. After the middle of May, when all fear of frost has passed, the sashes are entirely drawn off throughout the day, if fine, and, as a rule, replaced at night. Beans are commonly picked from frames about the second or third week in June, or about three weeks sooner than the earliest border ones come into use. A few frames, too, are also frequently occupied by French Beans sown thickly, for the purpose of transplanting thence to the open ground, and to fill any blanks that may exist in the frames in which the sowings for fruiting therein have been made. To the first out-door planting the warmest piece of ground or border that can be spared is devoted, and the Beans are planted therein in little patches under hand-lights. The usual way is, about the first week in April, to draw lines 3 ft. apart across the border, and others 2½ ft. asunder lengthways, and upon the middle of every little square thus marked place an ordinary hand-light, under which are planted eight French Beans, which have been pretty well hardened off previously. If there be not sufficient hand-lights for the whole space to be planted, half-bushel vegetable baskets are inverted over the plants; and, as they are so open to the wind, they are covered for a time with mats. As soon as the Beans have got a good hold of the soil and begun to grow, their protection can be removed. Great care must be exercised with hand-light Beans, otherwise they are a deceptive crop, and sometimes die off altogether, especially when nursed too tenderly and changed too suddenly, if the ground be cold and wet, and their top covering insufficient and permeable to frosty winds.

**Outdoor Crops.**—The first outdoor crop is usually transplanted thence from the frames, and the warmest possible position is selected for this purpose; the real time for so doing entirely depends on the state of the weather and nature of the ground. If the weather be fine, the soil moderately dry and light, and the position warm and sheltered, the plants are commonly transplanted during the first fortnight of April, but if otherwise, they are delayed a little later. Early French Beans are planted on a south border, in front of a wall or thick hedge if possible, which is dug over, and lined off in cross-rows at 18 in. apart, drawing the lines in the form of seed-furrows with a hoe. Herein are planted, 5 in. asunder in the row, near the middle of April, Beans raised in frames; they are earthed up in due time, and, if the weather be favourable, come into bearing a fortnight or three weeks after those grown in frames. Some growers erect barricades of mats in an upright position to stakes driven into the earth, and placed to the windward side of the borders; and they also surround frames containing them, but not covered with sashes, with the same protection to ward off cold and frosty winds, which are always detrimental to this crop. Sowing begins out of doors some time during the first fortnight in April, just as the state of the weather and soil permits, and the warmest available position is selected for the purpose. If the ground be free from all other crops at the time of sowing, there is more need for a sheltered place than if it were cropped. In sowing, the lines are drawn at 2 ft., 2½ ft., and sometimes at 3 ft. apart, and the seeds planted about 4 in. or 5 in. asunder. The earliest crop is generally sown on empty ground, otherwise in drills drawn between lines of Cauliflowers, Cabbages, or Lettuces. These crops, instead of being injurious to the French Beans when they appear aboveground, are simply beneficial to them, inasmuch as they protect the tender plants from cold winds until they have gained some strength and the weather becomes mild and warm, by which time the bulk of the Cauliflowers will have been removed for market. Even then, however, the French Beans do not get all the space to themselves, for no sooner is the earth cleared of the other crop than it is loosened a little between every alternate line, and those spaces replanted with Lettuces or Brussels Sprouts. Thus one space contains another catch crop while the other is empty; and by means of having this empty space to walk in, the gatherers can pick two lines of Beans, one on either side of the empty alley, and never disturb the other crops in the alternate alleys. Should the French Beans have come up well, and be nearly ready for picking before the first occupants of the soil are entirely removed, the alleys are not cropped again until the Beans become exhausted. The drills for sowing are drawn in the morning of a fine day and left until the afternoon, when the seeds are sown and some earth drawn over them. The first main sowing is made in the open field about the end of the second or third week in April, under the same circumstances as that already mentioned, or the field may have been previously planted out with Cos Lettuces in lines 12 in., 15 in., or 18 in. apart; between every two lines of these would be sown one of Beans.

**First Crop Failures.**—Many failures of the first crop take place if sown too early, especially in the case of cold and wet soils. Indeed, in a market garden at Hammersmith about an acre and a half of good ground had been sown about the end of March, in a promising season, with French Beans at 2 ft. apart, the grower being determined to be early. All seemed to prosper for eight days, and the seeds had swollen well, when cold weather set in and the entire crop was lost; but the ground was immediately planted with Walcheren Broccoli, so the loss after all was not very great. Successional sowings are made every fortnight or three weeks, until the end of June, by some growers, but most of the large growers sow their French Beans about the 8th and 20th of April, the first and last week in May, and the first week in July, the Scarlet Runners occupying the interval. The last sowing consists chiefly of the Negro, and just yields a good crop of young and fine pods before being destroyed by frost; whereas, were they sown a fortnight later, they would be apt to be nipped when coming into bloom. French Beans are likewise sown along both sides of Asparagus ridges containing two or more rows in April, in single rows, about 6 ft. or 8 ft. apart, with Custard Marrows grown between them; and in rows 3 ft. apart, with two rows of Shallots or Onions occupying the intervening alleys. Some growers sow late crops in rows 4 ft. apart, and plant two rows of Coleworts in every intervening alley. Before the seeds appear the soil immediately over the seeds is gone over and slightly loosened with an iron-toothed rake so as to permit of an easy egress of the seedlings. When sown in bare fields, even though Lettuces be planted amongst them, a little ridge of soil is frequently drawn to the north or windward side of them as an additional protection from cold winds. Whilst the plants are growing they are rigidly attended to as regards keeping clean and hoeing the soil, and when they reach 4 in. in height they are earthed up a little. The catch crops, too, are cleared away as soon as they are ready, in order to give the French Beans every opportunity of a healthy development, as they are reckoned a very remunerative crop. Those grown in frames come into bearing early in June, just according to how they are treated, and last in good picking condition for six weeks; and those in warm borders begin to fruit in the last week of June or first week in July, and continue to yield a fair crop for nearly two months in a moderately moist season if kept closely picked. The first main crop immediately follows the border ones, and as a rule lasts the longest. Drought makes them short-lived sometimes, but in rich soils, and warm, moist seasons, the yield is so heavy that it is scarcely possible to pick them as quickly as they grow. Drought, too, induces red spider, with which large fields are sometimes completely overrun,—and although this pest is very prejudicial to the health and longevity of the crop, there is no remedy for it. The Beans are gathered by women in baskets, which, when full, they carry on their heads to the ends of the rows, there to leave them to be carted home, where they are washed to remove the grit. They are then packed into round, half-bushel vegetable baskets, which are covered with Rhubarb leaves fastened down with withies, and piled one above another on the waggons that convey them to market three times a week. The market gardeners, as a rule, save their own seeds, and a piece of the first or second main sowing is generally selected for this purpose. The plants in the rows to be saved for seeds are first subjected to two or three pickings for market; then they are left untouched until they are fully ripe, when they are pulled up by the roots, tied into little bundles, and slung in pairs across a fence or rail to dry. Sometimes, too, the haulm is spread over sashes to dry, and in the event of wet weather is strewed under some spare sashes, where the pods get well dried without receiving any of the rain; they are sometimes spread out over a series of sashes resting on frames, and other sashes laid over them again, and tilted up at back and front so as to permit of a free current of air, where they dry readily. They are then safely housed, and during wintry weather are thrashed, cleaned, and stored in rough brown paper or canvas bags, or placed in drawers, or the corner of a loft, until sowing time arrives.

## Bean, Scarlet Runner

(*Phaseolus multiflorus*).

This is a native of Mexico, and is easily distinguished from other kinds by its thick tuberous root-stock, its large scarlet or white flowers, and rough pods. This variety of Bean not only ranks amongst the most useful of summer vegetables, but the plants themselves make excellent temporary green screens for hiding unsightly objects. Scarlet Runners are generally raised from seed, but the roots may, if desired, be taken up in autumn and preserved through the winter in dry sand or in soil in any shed or cellar from which frost is excluded. If roots thus wintered be brought out and planted about the latter end of May, they come into bearing a fortnight or three weeks earlier than those raised from seed sown at the same time. They are also sometimes left in the ground all winter, and protected from frost by a good thick layer of coal ashes placed over the rows. Thus treated they start early in May, if the weather be favourable; and when they have attained the height of 3 ft. or 4 ft., if stopped, will produce Beans much earlier than by any *other method; but if a* profitable crop be desired, this plan is not *to be recommended,* as the plants do not continue in bearing long as those that are raised from seed. Among positions chosen for Scarlet Runners may be named small patches of ground at the corners of walks, planting five or six seeds in a patch, 5 in. or 6 in. apart. Three stout poles or sticks, as used for Peas, are then placed round them in the form of a triangle, bent so as to meet at the top, where they are tied. In small gardens they are often trained over wire or woodwork, so as to form summer-houses or coverings for walks.

**Culture.**—In large gardens the general practice is to sow in open quarters, and where Beans are required as long in the season as they can be obtained and in large quantities, this is undoubtedly the best plan. They should be allowed a distance of at least 6 ft. between the rows, and if more can be afforded them, all the better. For early crops, a few rows may be made close under a south wall or fence, keeping the points regularly pinched out, in order to keep them dwarf and encourage the earlier development of the pods. In this case they will, of course, need no support, but be allowed to lie in a thick row along the ground. Beans may be produced in this way several weeks earlier than in open quarters, but they do not continue so long in bearing, nor do they produce such abundant crops. Where, however, earliness is an object, this plan may be followed with advantage. Seeds for this purpose may either be sown in heat and transplanted, or sown in the open ground where the plants are to remain. The former is the more troublesome, but it is the best where covering is at hand to protect them from cold winds and frosts after they have been planted. If sown in heat, the seeds should be put in about the second week in May, either in boxes or pots, the former being the best; they should be shallow, say not more than 4 in. or 5 in. deep, their size in other respects being of no great importance; they should have holes at the bottom for drainage, and should be half-filled with half-rotted leaf-mould pressed down rather firmly with the hand; slightly cover with fine soil, and upon this sow in rows 2 in. apart, and cover with about half an inch of finely-sifted leaf-mould, giving the whole a good watering. If placed in a Cucumber or Melon frame at "work," they will soon be up, and should be kept as near the glass as possible, in order to prevent them from becoming drawn. After they have made two single leaves, they should be taken to a cold frame or pit, gradually inuring them to the open air, so as to make them as hardy as possible previous to planting out, which may be done the first week in June. Before planting them out, they should have a good watering, and be taken out of the boxes with as much earth adhering to them as possible. Plant either in double or single rows, 4 in. or 5 in. apart, as close to the wall or fence as may be convenient. If they be then well watered and shaded from the sun for a day or two, and protected from cold at night, they will soon make a good start.

***Sowing in Open Ground.***—The first sowing in the open ground *for a general crop should* be made not earlier than the first week in May, for if they are up before the end of that month they are liable to be cut off with frost unless protection can be afforded them—a rather troublesome matter where large quantities are grown. Some draw drills in which to sow the seeds, but the best way is to plant them in with a dibble about an inch deep, and then draw the rake over the ground to fill in the holes. Double rows are to be preferred to single ones, as they produce more Beans. Each seed should be at least 6 in. apart. Managed in this way they grow strongly, and if stopped when they have attained the height of 5 ft. or 6 ft., they will produce fine large trusses of bloom from top to bottom. Where successions are desired, several sowings must be made. The general rule is to sow one good crop and let that serve all purposes; but if a sowing be made the first week in May, a second a few weeks afterwards, and another not later than the first of July, a continuous supply of young and tender Beans will be the result; the last sowing, however, should be only a small one. Sowing in trenches has lately been much practised, and in some cases no doubt with advantage; but when sown in deeply dug ground trenches are unnecessary. They are generally made with the view of affording an effectual means of watering the plants: but they necessitate the water being applied close to their bases, which is hurtful rather than beneficial to Runner Beans. Where, however, the earliest crop of Scarlet Runners has to be sown in open quarters, the best way is to take out a trench, say 3 in. or 4 in. deep, laying the soil on each side of it in ridges. Pea wires or bent Hazel sticks may then be placed on the rows after the seed has been sown and covered; these will afford good supports for mat or canvas protections until the plants will do without covering: after which time the soil may be put back in the trench, and no further earthing-up will be necessary.

**Sticking.**—Where procurable, common Pea-sticks are best adapted for Kidney Beans, but they require to be rather larger and stronger than for Peas; for unless firmly sticked, they are apt to suffer during rough, windy weather. Where, however, such sticks are not obtainable, stout poles, 7 ft. or 8 ft. long, may be used, placing them firmly in the ground at intervals of 12 ft. or 14 ft. apart along each side the row. Slender sticks cut the same length as the distance the poles are apart may then be tied lengthways along the poles 1 ft. or 1½ ft. apart; the plants will twine firmly round these, and thus support themselves.

With respect to soil, a light rich loam is best adapted to growth of the Scarlet Runner, and it should be deep, to allow of the roots descending in time of drought. Previously to planting, the ground should be deeply trenched and enriched by means of a liberal supply of good rotten manure. Where, however, time cannot be spared for this, trenches may be taken out 2 ft. wide and from 2 ft. to 3 ft. deep, according to the depth of the soil. The soil thus taken out should then have plenty of good manure mixed with it, and be replaced in the trench. If this be done in autumn it will be advantageous.

**Varieties.**—There are numerous varieties of Runner Beans, but those most generally grown are the common Scarlet Runner and Painted Lady. Carter's Champion has, during the last few years, been largely grown, and deservedly, for it is a fine productive Bean of good quality. There are many other kinds of Runner Beans that are by no means commonly grown, but which are yet of great special merit, and afford also differences in quality and flavour that make them specially acceptable. Allowing the Scarlet Runner, as it is, to be delicious, yet one may tire of it every day for weeks in succession; but if alternate dishes of equally good kinds that differ in character can be furnished, the pleasure of partaking frequently of Runner Beans is enhanced. Two of the very best of these Runners are the Eclipse and the Premier, both little known, but where known much appreciated. The Eclipse is a tall, strong-growing kind, having vine and foliage resembling those of the old Caseknife. The pods are long, flat, and straight, and are quite tender even when old. It is a heavy cropper, and furnishes a very abundant supply. It is also earlier than the Scarlet Runner, and thus assists to lengthen out the Bean season. Ripe seed of Eclipse is medium-sized, flat, and in colour dull green flaked with dark red. Premier differs entirely from Eclipse, inasmuch as it is really a Runner form of the dwarf French Bean; and as its character has been in this respect well maintained for the past ten years, it is, therefore, perfect reliable. A few years since, when grown with a large number of other kinds at Chiswick, it was considered sufficiently meritorious to receive a first-class certificate, and since then in its peculiar form it has not been excelled. The plant grows to a height of about 5 ft. It commences to crop close to the ground, and continues to bear heavily until the winter. The green pods are very tender and delicious when cooked, and it is altogether a really useful garden vegetable. The coloured-podded Beans are more novel in appearance than useful as table vegetables. The purple-podded kind partakes of the old Caseknife habit of growth and foliage. The pods are long, but soon fill with the seed. They are, as the name implies, purple in colour, and therefore not at all desirable at table. The blooms are also purple, and for a short time look pleasing and attractive. This Bean may be useful, and possibly ornamental to grow as an ordinary climber, but it has no useful place in the kitchen garden. The latest novelties among Runner Beans are the Wax-podded and Yellow-podded, or Butter Beans, the latter name being given more out of compliment to the colour of the pod than to its edible quality. These are termed skinless, or rather, like the pods of the Sugar Pea, they have no lining, and should be cooked and eaten whole. The colour is most objectionable, however, whilst in flavour the Bean is not equal to our green kinds. The varieties of Kidney Bean whose ripe seed is used for cooking purposes during the winter months are called Haricots; they come from the East Indies, where the kinds are said to be numerous. The species, however, are not nearly so abundant as is generally supposed; thus the Phaseolus vulgaris includes at least eight of the commonly adopted species of modern botanists, the P. lunatus four, the P. Max or Mungo (which is either dwarf or climbing, like the P. vulgaris) five or six, the P. truxillensis three or four, Dolichos (or rather Vigna) sinensis four or five, Lablavia vulgaris at least as many, Canavalia gladiata two or three, and so on. This multiplication of species has not been owing entirely to mere varieties of cultivation being considered as botanical species, but in several instances it has arisen from the same varieties having been received from Asia, Africa, and America, and separately described without adverting to their common origin. They are largely grown in some establishments, and are much appreciated by French cooks, who use them in many different ways. The Lima Bean is a kind very little known in England, but nevertheless well worthy of a trial. It is considered by some to be the best of the Bean family. The climate of England is not hot enough to grow it successfully out of doors; but after May is past there are in most places plenty of empty frames, pits, etc., in which it might be grown. It is a climber or runner, but if its tops be kept pinched in, as is often the case with Scarlet Runners, it may be kept in a dwarf state. It is shelled and cooked like Peas; and is also excellent when dried and cooked in winter like Haricots, to which it is greatly superior. Lima Beans are a rather troublesome vegetable to prepare for the table on account of the difficulty of shelling them. In the ordinary Lima there is a great waste of pod; the Beans are set wide apart, and the pod is often so constricted that the halves touch between the Beans. A large pod will frequently have but two, or at most three Beans; but this can be improved by always selecting for seed the fullest pods. The Lima is a distinct species (Phaseolus lunatus) from the common bush-and-pole Bean (P. vulgaris), and shows very little disposition to depart from its natural condition,—or, as the phrase goes, it will not "break" readily into varieties. Some years ago many experiments were made with the view of producing a low-growing or bush Lima, but its tall-growing disposition could not be overcome. A few years ago Mr. Henry A. Dreer showed some Limas which were considered an improvement upon the ordinary kind. They were the result of a careful selection carried on for some twenty years. In these Beans the pods are not only full with no spaces between, but the seeds so crowd one another that the ends of the central Beans are square; the Bean is also much thicker than the ordinary kind. A Bean of this description, bearing the same number of pods as one of the ordinary sort, would, we should judge, yield nearly, if not twice, as much in shelled Beans. It is stated that this variety is much more productive than the common species, yielding, as it does, many more pods. The pod being so completely filled, the shelling becomes an easy matter, and the Beans, when cooked, are much superior to the ordinary ones. Some of the tropical species of Beans are exceedingly beautiful, being of an almost dazzlingly brilliant col

They are natives of Hindostan, China, and Japan, among which are some that are not only beautiful in their dried state, but the growing plants are so different from our ordinary kinds that one can scarcely believe them to be Beans. A collection of from 50 to 100 kinds of Beans is not difficult to obtain by a little perseverance, and if arranged in neat phials they are very ornamental.

## Beet-root

(*Beta vulgaris*).

THE BEET-ROOT is a native of the south of Europe, and has been in cultivation both in England and on the Continent since 1660. It is used in much larger quantities in France and Germany than in England, although in this country it forms a very important kitchen garden crop. Many varieties are now largely grown in our flower gardens, on account of the ornamental character of their leaves.

In most establishments Beet-root is used all the year round for many purposes—in salads or for garnishing dishes for the table, etc.—and, therefore, its culture deserves to be encouraged in every possible way. A deep sandy loam, trenched to a depth of at least 30 in., suits it better than any other kind of soil, and if poor, it should have been well manured for the previous vegetable crop. In such soils, the evenest and cleanest roots are produced; but Beet will also succeed on calcareous soils, if of sufficient depth. Heavy or stiff loams intended for its growth should be thrown up into ridges before winter sets in, so as to get well pulverised, and, if very heavy, a light dressing of coal ashes worked into them would prove advantageous, and materially assist in producing clean roots; stable manure should not be added to the soil unless it is trenched deeply, when it may be placed quite at the bottom of the trench; if otherwise, as soon as the roots reach it they become forked, instead of making straight, well-shaped roots; therefore, if the soil be so poor as to require manure, a sprinkling of guano or superphosphate, applied to it between the rows as soon as the plants are fairly established, will be found the best stimulant.

**Sowing, etc.**—Beet must have an open situation; it never grows or looks satisfactorily when grown under the shade of fruit trees—a position to which it is often relegated; but this should not be, for most varieties of Beet are ornamental as well as useful, and one would, therefore, suppose that a conspicuous place would be selected for them. The time for sowing varies from the beginning of April to the middle of May. In the majority of soils, about the 20th of April will be found to be the best time; if sown too early, especially if the soil be rich, it is liable to run to seed, or the roots to grow too large—medium-sized roots being always most highly valued, more particularly for salading. The seed should be sown in drills 15 in. asunder, and 1½ in. deep; and it should be covered in by hand,—a rake should not be employed for this purpose, as by its use half the seed is often drawn out of the drills, and the plants come up irregularly. Thin out the seedlings, as soon as they are large enough to handle, to 9 in. apart in the row, and if dark, bronzy-leaved kinds be grown, see that the greenest-looking plants are drawn out. After thinning has been completed, by means of the hoe frequently loosen the soil between the rows—an operation which will aid the growth of the Beet, and at the same time keep down weeds. If blanks, through failures, occur in the rows, they should be filled up with young plants in showery weather, though roots obtained in this way rarely prove satisfactory, being small and irregular in growth; still it is worth doing, if only for the sake of appearance.

**Varieties.**—As a rule the colour of the roots is the first consideration; but flavour should in our opinion have precedence, rather than colour. Where both are combined, however, as is the case in Dell's Crimson, which has many synonyms, such a variety must be the best to grow; moreover, this variety has the additional attraction of deep crimson-coloured foliage, and is of no small importance as an ornamental plant. Other good varieties are—Henderson's Pine-apple, Dimmick's Nonpareil, Nutting's Dwarf Red, and Egyptian Turnip-rooted, the last being more especially suited for growth on shallow soils. Many other good sorts might be named, but these are the best, and they are sufficient for all practical purposes.

**Taking the Crop, Storing, etc.**—Frost is most injurious to Beet-roots, which should, therefore, be dug up by the end of October, or provision should be made for protecting them in the ground, in the event of severe weather setting in; this latter mode, though it entails the greatest amount of labour, is really the best way of preserving the full flavour of the root. Stable litter, hay-bands, or Bracken (Pteris aquilina) will effectually protect Beet, but, of course, where neatness is studied rather than utility, this manner of protection should not be thought of; in that case, the roots should be dug up at the time mentioned above, and "clamped" in the same way as Potatoes; or they may be layered in dry soil or sand, in a cool shed,—but it must be really cool, or they will start into growth, and the flavour will become deteriorated. When lifted, the tops should not be cut but screwed off, and the roots should not be injured more than can be helped, as injury to them induces decay. Before cooking, the roots should be well washed, but not peeled or scraped, or in any way bruised, for, if such be the case, much of the saccharine matter escapes during the boiling. To this process preference is generally given, and this mode of cooking doubtless renders Beet most agreeable to the generality of palates; though some prefer to bake it, by which mode a deeper colour of flesh is ensured, and a firmer texture, and where these are desired, or the roots are much bruised, baking should be the plan adopted. W. W.

**Beet-root in Market Gardens.**—Beet is a vegetable which is much *appreciated in the* London markets, and one which is very accommodating in regard to culture. The main sowing is mad to succeed Wallflowers, Radishes, Spinach, or Cabbages, and it is also often grown on Asparagus ridges, between rows of fruit bushes, and between lines of Vegetable Marrows; and even when grown in the open field it permits of being intercropped. It is also an accommodating root in winter, as it may either be left in the ground and thence marketed, or lifted and stored, as may be convenient to the grower, who may want the ground manured and trenched for Radishes or other spring crops. Dark crimson-coloured Beets are those which are most esteemed by market-gardeners, most of whom grow their seeds saved from selected plants. Carter's St. Osyth is a favourite with many growers. Although Beet succeeds best in an open situation, it is not in all cases that such a position can be assigned to it. The ground in which it is to be grown should not be manured beyond what it received for the previous crop, as freshly-manured ground causes the roots to fork, thus materially lessening their value. The soil should be deeply worked, however, in order to give the roots a downward tendency unchecked, and in this way fine, clean, medium-sized, entire roots are obtained. Such roots always fetch good prices. The first sowing is usually made where the plants are to remain, in lines about 15 in. apart, in the first week of May. Cleared ground is not always employed for this sowing, but, as a rule, the lines are drawn between rows of Cabbages or Lettuces, recently planted; after they germinate they are thinned a little with short hoes, and again when they form a few rough leaves they are thinned out to single plants. Many open the drills in the morning and sow the seeds in the afternoon, thus ensuring, they affirm, earlier germination than would otherwise be the case. Mr. Pocock raises good Beets after Wallflowers are cleared off between the rows of Gooseberry bushes. Mr. Dancer, of Fulham, and others, sow Beet seed on either side of their Asparagus ridges, but, thus circumstanced, they do not grow large. Transplanting Beets is only resorted to to fill up vacancies in the rows, as in the operation the main roots are often broken, or otherwise so damaged, as to render it almost impossible for them to produce good roots. Some make a sowing in March in a sheltered piece of ground, for yielding an early supply. In harvesting a field of Beet where the roots have to be kept through the winter, the roots are carefully dug up, preserving the whole length of the root intact, and keeping 2 in. of the crown attached to it after the leaves are removed. They are first stored in pits, 4 ft., 5 ft., or 6 ft. wide at the base, tapering about 3 ft. in height. They are then covered with straw, over which a coating of soil is put to exclude frost. Leaving the roots in the ground is reckoned the best plan, as their proper flavour is thereby preserved better than when lifted and stored; but they are liable to be injured by frosts in January, or to be locked in the soil when it might be convenient to send them to market. Some of the darkest and finest-shaped roots are kept for seed-bearing plants, and are planted in some out-of-the-way nook by themselves.

## Borecoles or Kales

(*Brassica oleracea*).

As illustrating the effects of domestication and culture, few, if any, of our garden or field vegetables exhibit so many features of interest as the Borecoles or Kales. Originating from the common wild Cabbage of our coasts, we have, first, the Borecole or Greens, and its numerous varieties: these represent the first improvement upon the wild type, and first step towards domestication. Next we have the common Cabbage, unlike its prototype manifesting a disposition to close in its leaves before going to seed, and to form a head or heart; and of which all the garden kinds, including Coleworts, are simply varieties, differing but little from each other, except in size and hardiness. After the Cabbage comes the Savoy, differing from the former only in its crumpled or blistered leaves, and in being perhaps a shade less hardy. Next come the Brussels Sprouts, and lastly the Broccoh and Cauliflower. Notwithstanding their common origin, all these varieties possess fixity of character, always coming true from seed, in cultivation at least; and, except the Potato, perhaps there is no vegetable which is more extensively cultivated or more generally used. The common Greens or Kale, the hardiest of the whole tribe, afford us a supply of wholesome and nutritious vegetables when all else in the shape of growing crops fail; and in large gardens one or other of the Brassica tribe are in use throughout the year, being the staple vegetable of the garden. In the Cauliflower and Broccoli we have a plant differing from the Greens and Cabbage class, principally in the abnormal development of the flower-stalk and seed-head; but it is in the Brussels Sprout that we have the most singular deviation from the original type. In it we have neither the dwarf open-hearted Colewort nor the hearting Cabbage, but a Cabbage, or rather a Savoy, with a tall stem, which bears a numerous progeny of small Savoys regularly along its stem. At one time it was supposed that the Brussels Sprouts degenerated after the first sowing—away from the neighbourhood of Brussels, where it originated; but it has since been proved that the English-sown varieties are just as permanent in their character as the Continental sorts. Still, a great proportion of the seed is imported, and is preferred by many.

**Sowing and Planting.**—The usual time for sowing most of the varieties of Kales, or Curled Greens, is from the beginning to the end of April. The seed should be sown thinly in drills 4 in. or 5 in. apart, and transplanted when large enough to handle, at a distance of 8 in. or 9 in. from plant to plant. Thus treated, they will be ready for planting where they are to remain by the end of June, and should be planted from 2½ ft. to 3 ft. apart, according to the requirements of each variety. If the ground be occupied by Potatoes, they may be planted between the rows, providing the haulm of the Potatoes is not so rampant as to exclude the plants from air and light.

A good, strong, but open soil is necessary to grow Kales perfectly. It is not, however, advisable to have too rich a soil, or rank growth, of coarse and inferior quality, will be the result. Land that has been manured for previous crops will be found to answer best, but it should be of a good loamy nature, and not too light.

**Varieties.**—There are now in cultivation many varieties of this useful early winter, spring, and late spring vegetable, in which great improvement has been made of late years, both by introducing some good new varieties and also by crossing and improving the old ones. The old Scotch or Curled varieties, both dwarf and tall, have been so improved by care and selection that the foliage is beautifully curled, close, and of such a lovely green that it has come much into request for garnishing. The variegated Kale, which is of almost every colour, striped and mottled with every intermediate shade from silver-white to deep purple, is also as good for cooking purposes as any of the others. The Buda Kale, when procured true, is about the very best late variety, and the most hardy of all. It is also of a superior flavour and colour when cooked. For a late cold spring, when vegetables are getting scarce, this variety is most valuable, lasting in fine condition till spring Cabbage is well in season; and its tender shoots, carefully gathered and tied in bunches, like Asparagus, and served at table in the same way, are nearly as good as Asparagus itself. There are also many other well-proved useful varieties, which come into succession from January to May, such as the Siberian, Egyptian, Cottager's, Jerusalem, Thousand-headed, Ragged Jack, Delaware, Scotch Cabbaging or Hearted, etc. Varieties have, however, of late become so intermixed one with the other, that it is almost impossible to tell which are the best kinds: we therefore reprint a report of

## Kales Grown at Chiswick.

It is proper to state that, although many errors in nomenclature are to be found in this report, apparently originating among the seedsmen, no blame is to be attributed to them, nor is there to be any impeachment of their good faith on that account; for this confusion of nomenclature has existed not only for years but for generations, and however anxious they may have been to correct it, the task was one most difficult of accomplishment. Now, however, that something like order has been attained, a more general concurrence in nomenclature will probably be maintained.

**Asparagus Kale.**—The original Asparagus Kale of a century and a half ago was a sprouting Broccoli, which was introduced from Italy. It received its name from the young shoots, terminated by a "button," bearing somewhat of a resemblance to the young shoots of Asparagus. In course of time the name gradually ceased to be identified with the Broccoli, and was applied to another variety of Kale, also introduced from Italy, called Milan Kale, or Chou de Milan, which has the property of throwing up in the spring a profusion of long succulent shoots, which, when fully grown, resemble the shoots of Asparagus. But there are several other varieties of Kale to which the name is applied; and as there seems no uniformity on the subject, I shall quote the varieties which different seedsmen regard as Asparagus Kale. Messrs. Minier, Nash & Nash, are correct in supplying Milan Kale; Messrs. Fraser and Mr. B. S. Williams supply Buda Kale; Messrs. Beck & Co., Messrs. Carter, Messrs. Clarke & Sons, and Mr. G. Gibbs supply Couve Tronchuda; Messrs. Wrench, Sutton, Lee, Nutting, and Mr. W. Paul, supply Siberian Kale; and it is to be remarked that, as all these varieties produce an abundance of succulents in spring, the name is not misapplied; still it would be as well if it were confined to one particular variety, and that this should be the Milan Kale.

**Buda Kale.**—This is one of those varieties that are called Asparagus Kale. It is very dwarf-growing, the stock being not more than 6 in. high, and very leafy. In this condition it remains all the winter; and in spring numerous long shoots are produced, some of which are from 2 ft. to 2½ ft. in length. The leaves are smooth and very much waved. There are three varieties of Buda—the green, the purple, and the lettuce-leaved or strap-leaved. There is no difference, except in colour, between the green and the purple varieties; but the lettuce-leaved is very distinct, the blade of the leaf being decurrent down the whole length of the footstalk, resembling in that respect the leaf of a Lettuce, or of Laing's Swedish Turnip. As regards utility and fertility there is no difference; and all are equally hardy. The Buda of Messrs. Minier, Nash & Nash, and of Messrs. Wrench, was true; that of Messrs. G. Gibbs, and of Messrs. Lee, was Siberian; and that of Messrs. A. Henderson & Co. was Couve Tronchuda. It was also received from the following sources perfectly true, under different names, thus:—From Messrs. Fraser and Mr. B. S. Williams the purple variety as Asparagus Kale; from Messrs. Carter and Wrench as Delaware; from Messrs. Wrench as Jerusalem; from Messrs. A. Henderson & Cattell as Purple Jerusalem. The green variety was sent by Mr. J. Grant as Lapland Kale, by Mr. Cattell as Egyptian, by Messrs. Sutton as New Winter Kale, and by Messrs. Vilmorin, of Paris, as Chou à Faucher. The lettuce-leaved variety was sent by Messrs. Clarke and Sons as Jerusalem Kale.

**Cottagers' Kale.**—It seems to be generally agreed that the Cottagers' Kale is to preserve its undisputed individuality, as there were no instances, throughout the trial, of this excellent variety being received under any other name.

**Curled Kale.**—By far the most popular and most extensively cultivated of all the Kales are the Curled or Scotch Kales, sometimes also called Curlies, German Greens, or Borecole. There are four distinct forms of the Curled Kale—the dwarf and tall green curled, and the dwarf and tall purple curled. Those which are most generally cultivated are the green forms; and the great object of cultivators is to obtain these with the leaves as finely and as much curled as possible; and in proportion as they are so, the more or less is the stock appreciated. Hence has arisen the great number of names under which they are sold. From Messrs. Drummond and Mr. Cattell the green form was received as Prince of Wales; from Messrs. Clarke and Carter as Hearting Kale; from Messrs. Hurst as Cabbaging and Tall Curled; from Messrs. Sutton as Sclater's New Cabbaging; from Messrs. Carter as Feathered Scotch and Abergeldie; from Messrs. Lawson as Superb Parsley Curled, Williams' Matchless, and Pontefract Green Curled; from Messrs. Stuart and Mein as Tynningham; from Mr. W. Paul as Jackson's Late Curled; from Messrs. Fisher, Holmes & Co. as Dwarf Green Curled Handsworth; from Messrs. Veitch as Veitch's Dwarf Late Curled; from Messrs. Minier, Nash & Nash, and Messrs. Beck, as Dwarf Green Curled Canada; from Messrs. F. & A. Dickson as Dickson's Imperial Dwarf Curled; and from Messrs. Barr & Sugden as New Moss Curled. All of these differed from each other only in the degrees of intensity with which the leaves were curled; and in this respect the New Moss Curled of Messrs. Barr & Sugden was remarkable. The Dwarf Purple form was sent by Messrs. Carter as Jerusalem Kale, and by Messrs. A. Henderson as Lapland; the Tall Purple from Messrs. Wrench as Brown Borecole.

**Jersey Kale.**—This is also called Cesarean Cow-cabbage, Tree-cabbage, and Jersey Borecole. It is a tall-growing plant, attaining the height of 4 ft. or 5 ft., the stem clothed with long, broad, glaucous green leaves with long foot-stalks. In spring it throws out numerous long, slender shoots, with which cattle are fed. It is never grown as a garden vegetable.

**Long Scotch Kale.**—This was received from Mr. W. Gorrie, of Edinburgh, as the true "Long Scotch Kale." It is the normal form of the Wild Cabbage as it is found on the Dorsetshire coast. It was sent by Messrs. Vilmorin under the name of Couve Murciana—and by Messrs. Sutton, of Buckman's Hardy Winter Greens.

**Marrow Kale.**—This is the Chou Moellier of the French—a form of the Jersey Kale which produces a long thickly swollen stem like a gigantic cigar, the swollen part being filled with a mass of tender pith. There are three varieties of the Marrow Kale, distinguished as the White, the Purple, and the Small. The White grows from 4 ft. to 4½ feet high, the stem being smallest at both ends and thickest in the middle, where it is about 1 ft. in circumference in the largest specimens.

**Milan Kale.**—The name by which this is often called is Chou de Milan. It is unfortunate that it is so; for Chou de Milan is the name given by the French to Savoys. Except that they both belong to the same genus, there is no resemblance whatever between the Milan Kale and the Savoy. The Milan Kale produces a stock from 18 in. to 2 ft. high, clothed with plain bluntly-toothed leaves, and terminated by a close rosette of leaves forming a small incipient head. In spring it throws out a large quantity of fine succulent shoots, which, when cooked, form one of the most delicious dishes of the Winter-green class; and it is from this circumstance that the plant has been called Asparagus Kale. From Messrs. Beck & Co., G. Gibbs, Nutting, Minier, Nash & Nash, and Cooper, it was received perfectly true under the correct name. There is a purple variety received from Messrs. Vilmorin under the name of Flanders Purple.

**Palm Kale.**—The stem is 2 ft. to 2½ ft. high, clothed with large, oblong, obovate leaves, the blades of which are decurrent the whole length of the footstalk, of a dark green colour, and curve gracefully upwards and outwards, giving the plant the aspect of a miniature Palm. In the spring it throws out a profusion of long slender shoots, which are of no value as a vegetable. After these shoots are produced, the plant entirely loses its ornamental character. It was received from Messrs. Vilmorin under the name of Chou Palmier.

**Ragged Jack.**—Like the Cottagers' Kale this seems to have few synonyms. Its character is sufficiently distinct to render it easy of identification, being a very dwarf variety with a stock not more than 4 in. to 6 in. high, and leaves which are deeply laciniated, the segments being trifid or multifid. It is generally of purple colour, but occasionally green. In the spring it produces a great quantity of tender shoots, which are much esteemed. It was received from Mr. B. S. Williams as Camberwell Borecole.

**Siberian Kale.**—This is one of the hardiest and one of the best of all the sprouting Kales. It is also very distinct, and can never be confounded with any other variety. The stock is very dwarf, being only 4 in. to 6 in. high. The foliage is always green. The leaves are sinuated, coarsely serrated, and plaited on the margin. In spring it produces a large crop of tender shoots, from 12 in. to 15 in. in length. This is one of the varieties the nomenclature of which is very confused. From Mr. B. S. Williams it was received quite true as Siberian, or Lapland; from Messrs. Wrench, Sutton, William Paul, Lee, and Nutting, it was received under the name of Asparagus Kale; from Mr. G. Gibbs as Buda Kale; from Messrs. Nutting, A. Henderson, Cattell and Drummond, as Delaware; from Messrs. Minier, Nash & Nash, Sutton, G. Gibbs, Lee, Carter, and Cooper, as Jerusalem; from Messrs. Carter as Acme; and from Mr. Cattell as Curled Jerusalem.

**Woburn Kale.**—This closely resembles the Wild Cabbage and Long Scotch Kale; but it appears to be of a more perennial character. It may be propagated by cuttings, as, indeed, all the other varieties may; but it is more woody and shrub-like in its growth. It is not worth cultivating, except in very northern and exposed situations, as it is very hardy, and will stand more rigorous winters than perhaps any of the other varieties.

## Broccoli

*(Brassica oleracea Botrytis asparagoides).*

THIS is one of the most useful and delicate of the Borecoles, and forms one of the principal crops of winter vegetables; and to keep up a continuous supply, from the time Cauliflower is over in the autumn until it can be had again in the summer, requires some little forethought and practical judgment. As a rule, in private establishments Broccoli is cut when about a third or half its full size; therefore the great aim of private growers should be, not the production of gigantic heads, but a constant succession of firm compact Broccoli of medium size. Some growers choose a few good kinds and make successional sowings, whilst others select a number of varieties that will naturally succeed each other although they be all sown and planted out at the same time.

This is doubtless the best plan when the ground intended to be occupied with Broccoli can be all spared and got ready at one time; but it frequently happens in establishments where the demand for vegetables is greater than the ground allotted for their culture can supply, that part crops have to be planted as the ground becomes vacant. Many people plant Broccoli between rows of Potatoes, and where the ground is limited and the kinds of Potatoes grown are dwarf and planted a good distance apart, it is doubtless a good system. Where this system is adopted the very hardest pieces of land should be selected for the Broccoli; for the firmer the land, the better the plants stand the severity of the winter. They also come into use more regularly in rotation in their several seasons, and form larger and closer hearts than if planted in less compact soil. Plenty of room to grow must, however, be allowed them. Supposing two rows of early or second early Potatoes are planted from 20 in. to 2 ft. apart, there should be two rows of Potatoes between every two rows of the Broccoli, which will place the rows of Broccoli about 3 ft. 6 in. or 4 ft. apart; and this distance is not too much, as it gives both crops plenty of room to develop themselves. The Potato haulm should be turned from the Broccoli to the unoccupied space between each two rows of Potatoes. It is now a very common practice to plant many of the Brassica tribe with a crowbar; the holes are filled in with fine soil, and afterwards thoroughly soaked with water.

**Sowing and Planting.**—Though June is the month in which most gardeners try to get their plantations of Broccoli finished, yet it is frequently July before the work is done. Plants put out in August will make nice heads, but the sooner the planting is done after the middle of June the better. Though planting early ensures the finest plants and largest heads, the time of sowing or planting does not materially affect the plants as regards the time they come into use. The time for sowing Broccoli seed varies from February till April, according to different localities; as a rule, from the end of March to the middle of April is the best time if the weather be genial. The best manner of sowing we have found is that of sowing in shallow drills about 6 in. apart, and if the seed can be depended upon as being good, it should be sown thinly. The whole sowing may be made at the same time, and planted at the same time, for convenience sake; and by planting many varieties a regular supply throughout winter and spring may be ensured when the winters are reasonably mild—for it is certain that no practice as to time of sowing or planting will ensure the heads forming at a certain time, if during winter we have protracted periods of frost or cold, during which all growth is at a standstill. Plants from sowings made early in April, as recommended, will under favourable circumstances be large enough for pricking out by the middle of May; they should have a moderately rich open border assigned to them, where they can have the benefit of the sun to keep them strong and sturdy. They should be pricked out 7 in. or 8 in. apart from plant to plant, and by the beginning of June the ground should be prepared and the plants finally planted out,—choosing a showery time if possible, otherwise recourse must be had to the water-pot. Many people never transplant their Brassicas previous to their final planting; but where time can anyhow be spared it is much the best, as the plants get larger and stronger, and are better able to resist the attacks of slugs, snails, etc., than small plants put out direct from the seed-bed.

Though it is by no means an unusual thing to see nice little heads of Broccoli in cottagers' gardens where the soil is seldom turned over more than a spade's depth, and not over liberally manured, yet the plant likes a deep and rich soil. If practicable, the ground should be trenched two or three spades deep, or at least double-digged. When there is not time for doing either of these, then the ground must be dug over a spade deep only, taking care to break the soil up thoroughly, as deeply as a good spade will do it, and working in some well-decayed manure at the same time; the soil being broken up well in the trench, and the surface a little rough. Planting should be proceeded with as soon as the digging is finished. If the planting be done in June or July, from 2½ ft. to 3 ft. must be allowed between the plants; if deferred till August they need not be allowed so much room. If the weather be dry, the seed-bed or that from which the plants are taken should be watered well the night before, to soften the soil. The holes to receive the plants should always be made sufficiently large to admit of their being easily put in without breaking their roots. "Buttoned" and stunted plants are in many cases caused by bad planting. They are put in with broken and mutilated roots; and those that have a tap-root often have it bent double in getting it into the hole, and, instead of the point being at the bottom of the hole, it will be sticking up above the surface. No one should wait a very long time for wet weather in which to plant Broccoli: it is better to get the planting done and water well once or twice, and the plants will then do till rain comes. When the plants are fairly established, and have grown a little, they must be earthed up wit the hoe, which will prevent the wind from twisting them about and disturbing their young roots.

**Soil and Manure.**—Broccoli thrives best in a deep loamy soil, well drained; but it is not very particular in this respect, and will produce fine heads in any well-enriched soil of which the staple is loam. In old garden soils in which humus has accumulated, it is often attacked with the grub or maggot, which causes "clubbing." In such cases lime may be applied with great advantage, or burnt clay and fresh loam, if it can be afforded. The ground should be trenched two or three spades deep previous to planting, and the manure, if rotted, well incorporated with the soil, or if rank, buried in the bottom of the trench. If trenching cannot be done, then Broccoli should follow some other crop, such as Potatoes or Onions, or any crop not belonging to the Cruciferæ or tap-rooted section, such as Carrots, Turnips, or Beet, and the ground should be dug as deeply as a good spade will go, and well manured. Where the soil in which Broccoli is to be planted is naturally of a light character, if moderately rich, it should not be dug, but made as firm as possible round the plants.

The best kind of manure for Broccoli is undoubtedly well-rotted stable manure, with a sprinkling of soot added to destroy worms. Watering is seldom necessary after plants get well established.

**Heeling-in Broccoli.**—As regards the heeling-in or layering of Broccoli, there has been much dispute: many growers think it a great advantage, whilst others think it at least unnecessary. That it has merits and demerits there can be no doubt, but as a rule private growers are in favour of the practice of layering; their objects being, firstly to check growth, as they believe that disturbing a considerable portion of the roots has the effect of hardening and solidifying the whole plant, and of enabling it better to withstand severe weather; secondly, to place the plants in such a position that the sun, during alternate frost and thaw, will not get to the hearts, as these suffer more from frost in the night after being thawed by the sun in the day than when continuously frozen. For this reason the heads are laid so as to face the north or west. To accomplish this, if the rows run east and west, they commence on the north side of the first row, and take out a spit of soil just the width of the spade, so as to form a trench within 2 in. or 3 in. of the stems of the plants, laying the soil, as the work proceeds, on the side away from the row. This necessarily removes the soil from the roots, no more of which is broken off than can be avoided. All the plants in the row are then regularly bent over, until their heads rest on the ridge of soil taken out of the trench. When this is done, commence with the next row, taking the soil out so as to form a similar trench, and laying it in a ridge upon the stems of the row of plants bent over, so as to cover them right up to their bottom leaves; and, in this way, proceed until the whole is completed. If the rows stand north and south, the work is begun on the west side. By this process, as will be seen, all the roots on one side of each row, and a portion of those on the other, are considerably disturbed, which causes the leaves to flag a good deal for a week or two, and has thus the desired effect in checking growth. The larger and more vigorous the plants, the greater the supposed necessity for thus preparing them for winter. In light soils, where they can be got up without much mutilation of the roots, should it be desirable to prepare the ground for some other crop before the Broccoli is off in spring, they may be taken up altogether and laid in some more convenient place, lifting them, as far as possible, with all their roots intact. Where time can be spared, we believe this to be a good system, as we have frequently noticed that where Broccoli is properly managed in this way, it is only during exceptionally severe winters that it gets destroyed, and the drier the land is the more frost the plants will bear without injury. The length of time during which this vegetable affords a succession, at a period of the year when there does not exist much variety, makes it worth while to do all that is possible to preserve it.

Fortunately, however, severe injury to the Broccoli crop is the exception rather than the rule, and is quite as likely to be the consequence of imperfectly-ripened stems as of hard weather. The immense breadth of Broccoli grown for the London markets renders any process of heeling-in almost impossible. A few hundreds of plants might be so managed ; but when hundreds of thousands are in question, the case is different. There are very large breadths of Broccoli grown in Kent, the consignments in some seasons averaging as much as 12,000 heads per day; in some cases it is probable that there are a quarter of a million plants in a piece ; and one scarcely sees a failure anywhere. We sometimes see near the Shepperton station, on the Thames Valley Railway, splendid breadths of Broccoli as much as 18 or 20 acres in extent. Such extents as these show that market growers cannot afford to "heel-in" their crops of this esculent; and yet they are in every way excellent, and failures seldom occur.

**Varieties.**—There have been many new varieties lately added to our lists of Broccoli, many of which are of especial merit; but still it is not advisable to discard old and tried varieties to make place for those of less certain merits. There are many varieties that are new in name only; and often when we think we are selecting a dozen kinds, we are in reality only selecting a few bearing several names. Then again some kinds will succeed better in some localities than in others, according as the soil or situation is suited to them.

Amongst the many good kinds of Broccoli for succession the following may be mentioned as some of the best :—Grange's Early White, Adams' Early White, Snow's Winter White (this is perhaps the best in cultivation), Early White Cape, and Osborn's Winter White. The foregoing are early and mid-season kinds. The best late kinds are Chappell's Cream, Dilcock's Bride, Wilcove's Late White, and Cattell's Eclipse,—the latter being the best late variety in cultivation, and lasting through the spring until Cauliflower is plentiful. The Sulphur, Purple Sprouting, and Late Purple are all hardy kinds, and very useful, but as a rule their colour is objected to in private establishments.

Among new varieties of Broccoli lately sent out the two following are highly recommended as being great acquisitions to all growers of this valuable vegetable. One variety was sent out by Messrs. Watts, of Northampton, under the name of Excelsior; and the other by Mr. Cooling, of Bath, under the name of Matchless. They are both mid-season sorts, coming into use from the middle of March to the middle of April. Both kinds are thoroughly protected by their leaves, and the heads may be cut snow-white before they become exposed to the air; while their flavour, when cooked, is everything that can be desired in a Broccoli. When the heads come in too fast, as in other varieties, the leaves can be tied over them to preserve their colour; and, either for growing for market purposes or for private use, these two sorts are said to be the very best in their season. Another new variety, sold under the name of the Leamington Broccoli, has recently been certificated by the Royal Horticultural Society, and is said to possess good qualities.

**Protecting.**—When Broccoli comes into use in too large quantities at a time, and a blank in the supply is likely to occur, some of the plants may be taken up and placed in an open shed in which there is a fair amount of light and air, some ordinary soil may be put into it, and the plants, the heads of which shall have attained a usable size, may be placed in the soil,—but not too thickly, or the leaves will turn yellow and injure the heads. If this be done in succession as the plants form heads, there will always be on hand a supply of Broccoli. Frames or pits are of course better than a shed in which to keep them, but these are generally required for other purposes. The practice of taking up Broccoli in autumn when nearly fit for use, and hanging them head downwards in a shed or other building, is not good; for, although they will keep for a time in that way, they get tough and inferior compared with those that have had their roots in moist soil.

**Growing for Exhibition.**—When Broccoli is required for exhibition, small plantations should be made in different situations, in order to make sure of having them in at the required time. For this purpose large compact heads are indispensable, though it is better to have them a little small and close than large and open. Trenches are sometimes dug for the plants, and it is a good system where time can be spared. The trenches should be dug 2 ft. wide and two spits deep; the top spit being taken out and laid on each side, then a good thick coat of fresh horse-dropping, or rotten manure, thrown in the trench, to be turned in and well incorporated with the second spit. The plants may then be put in, and as they grow the soil that was taken out of the trench may be put back round the stems of the plants and trodden in firmly. Good soakings of manure may be given them when the soil is dry, but after the heads are once formed it must be discontinued, or it will cause the flower to open. In cutting, the whitest and firmest heads should be selected, and the more they resemble each other in size and appearance the better; they should never be trimmed until they are going to be put on the exhibition table, and then not so severely as is often done. If it be necessary to cut the heads some time previous to their being wanted, the best way is to divide them with 5 in. or 6 in. of stem and stand them in shallow pans filled with cold water and put in a cool place. The leaves should be tied over the flower, and if an occasional sprinkling overhead be given them, it will help to keep them fresh. This will be found better than pulling up the roots and hanging them up in sheds and similar places.

**Broccoli Culture in Market Gardens.**—The chief supplies of White Broccoli brought to the London markets between November and April are grown in the south and west of England, but principally about Portsmouth, and Penzance in Cornwall. From these sources Broccoli is obtained in large quantities, and of excellent quality. In the market gardens about London the Purple Sprouting, the Walcheren, Snow's Winter White, and Cock's Late White, are the kinds chiefly grown. The first sowing of Sprouting Broccoli is usually made in April on a rich piece of ground, either in beds or broadcast. When the young plants appear aboveground they are first hand-weeded, and afterwards thinned by means of narrow hoes. As soon as they are strong enough for transplanting they are planted in rows about 2 ft. apart under fruit trees, or in some other shady situation—this crop, owing to its succeeding tolerably well in shade, seldom being afforded an open quarter. When planted between rows of fruit bushes, two lines are inserted in the intervals between every two rows; but if two drills of Potatoes occupy this space, then only one line of Broccoli is planted, and that between the two drills of Potatoes. Should the whole space under an orchard be planted with Potatoes in drills about 2½ ft. apart, as soon as these are earthed up, Broccoli is planted between the rows without the soil being loosened. The Potatoes ripen before the Broccoli can injure them much, and when the Potatoes are removed the Broccoli has the whole space to itself. The trees lose their leaves in October; therefore the Broccoli, having the benefit of increased light, becomes invigorated, and during that month and November begins to afford a good supply of sprouts, which are not all gathered at once, even from the same plant, but at intervals, as they become fit for use. Unless the soil planted with Broccoli be rich, the plants are liable to club, and if the ground be too dry, premature sprouting, before there is a market for the produce, is the result. Another sowing is generally made in the middle of May; indeed, from this sowing the principal winter crop is obtained, and more plants are raised than are absolutely required, as all clubbed and weakly ones are discarded at planting time. Sometimes the time of year when ground will be vacant materially influences the season for sowing; for it is an important matter to have the young plants in a healthy stocky condition at planting time. If sown, therefore, so early as to have to be kept in the seed-bed until they have become "drawn," they sprout sooner than required, and before there is any demand for them. For late sprouts a sowing is made about the end of June or first fortnight in July, the produce of the first sowing being transplanted. From this sowing sprouts will be obtained in the following spring in March and April, and after they are removed the ground is in good condition for receiving Wallflowers.

## Brussels Sprouts

*(Brassica oleracea bullata minor).*

THIS is one of the most important of the Brassicas, and is more closely allied to the Savoy than to any other of the Cabbage tribe. Brussels Sprouts were formerly thought to be too tender to withstand our severe winters, but it has been proved beyond a doubt that they are quite as hardy, if not more so, than any other species of the Cabbage. As a rule, Brussels Sprouts are only cultivated in gentlemen's establishments and market gardens, although they are well deserving of a place in every garden, however small. With a little skill and forethought, they may in warm districts be got to supply the table with a most excellent vegetable, from September till April. In many establishments, the common rule is to sow one good batch in March or April, and let that serve all purposes. Where, however, a long supply is desired; this is decidedly a mistake, inasmuch as Sprouts ought to be made use of as soon as they are ready, otherwise they burst or become rotten, and are consequently useless. It is therefore obvious that successional sowings should be made, to keep up a constant supply.

**Sowing, Planting, etc.**—Sowings for early crops are sometimes made in October and transplanted in the spring; but there are objections to this way—viz., the plants become stunted, and their stalks bent and unshapely during the winter, and when put out do not grow away with that vigour usually seen in spring-sown plants. The plants from this sowing are also very liable to run to seed—especially if, after they are up in the autumn, the weather be mild and they make free growth before winter sets in. For early crops the best plan is to sow a pinch of seed in a shallow box well drained, early in January, and place it in a pit or frame where the temperature is from 40° to 45°. The plants will soon be up, and should be kept close up to the glass until they are large enough to handle, when they should be pricked off into other boxes or out into a bed in a frame. Plenty of air must be admitted to them after they have again commenced to grow, and if the weather be favourable in the middle of March, they may be planted out of doors on the warmest border that can be spared for them. If the plants be taken out with a good ball of earth and planted during showery weather, they will grow away without a check, and a crop of fine large sprouts in September will be the result.

The first sowing out of doors should be made in February or March, the main sowing early in April; and if later supplies be required, a small sowing may be made in May or June. When the plants are large enough to be conveniently handled, they should be pricked out in rows into narrow beds or borders, 5 in. or 6 in. apart, or more if practical. The distance apart of the plants for the final planting must in some measure be governed by the space at disposal, but in any case there is nothing gained by overcrowding. Plants for the main crop should be allowed at least 2 ft. apart each way, but if 3 ft. can be allowed between the rows it will be all the better. If extra fine sprouts are desired, 3 ft. from plant to plant each way must be allowed. For early and late plantations it is not necessary to allow quite so much space as for the main crop.

**Varieties.**—There are several varieties of Brussels Sprouts named in seedsmen's catalogues, but it is at least doubtful if they be really distinct. No doubt much has, and may still be, done to improve them by persistently carrying out a system of selecting seed from the best and most prolific plants only; and there are few vegetables that will better repay any extra care or trouble incurred in carrying this matter out in a thoroughly practical manner. The best way is to get a good sort and save your own seed from the best plants you have. In the north and cold wet districts Brussels Sprouts cannot be had in season so long as in southern districts, but they are often grown very fine. The varieties that are considered the best are Imported Brussels, Scrymger's Giant, Dalkeith, Roseberry, and Albert Sprouts.

**Soil, Waterings, etc.**—Brussels Sprouts will succeed in almost any kind of soil, provided it is well and deeply cultivated and fairly manured. Poor sandy soil will require a heavy dressing of good manure, whilst lime and burnt clay may be beneficially applied to cold clayey land in preference to rank manure just previous to planting, which would have a tendency to produce gross open sprouts instead of the close medium-sized buttons so much appreciated in the kitchen. Frequent stirrings of the soil, general clean culture, and removing decaying leaves add to their growth and cleanly appearance, and ought to be insisted on. As regards earthing up the stems, there has been much dispute as to its merits and demerits, but we have seen them grown both with and without that assistance, with much about the same result. In windy places earthing up is certainly to be recommended, in order to enable them to resist the power of the wind; but as Brussels Sprouts, unlike Cabbage or Broccoli, bear all up the stems, it is not desirable to bury them to any great depth beyond giving them necessary support. The Cabbage-like heart from the centre of the plant should not be cut off until the crop is fit for gathering. The London market gardeners prefer, as a rule, stems of medium length, from which they think they get the hardest and best sprouts; with them, however, Brussels Sprouts are chiefly grown as catch-crops.

Good soakings of manure water given to Brussels Sprouts during dry weather, will help to keep them in a vigorous and healthy growing state.

**Gathering.**—In gathering, Brussels Sprouts are frequently broken from the stems of the plants, and sometimes with a portion of the stem adhering to them: this is decidedly a great mistake, inasmuch as it destroys the second crop of young sprouts. A sharp knife should always be employed to cut off the sprouts, leaving as much spur as possible without impairing the size of the sprout. The largest and hardest should always be gathered first, in case they should burst and consequently become spoiled.

## Cauliflower

*(Brassica oleracea Botrytis cauliflora).*

THE CAULIFLOWER is evidently indigenous to a warmer climate than that of Britain: but about the exact place in which it was first found there appears to be some uncertainty. Some writers say it was introduced into Europe from Cyprus, whilst others think it was found in Candia and other parts of the Levant. Be this as it may, it is evidently a plant from a much warmer climate than ours, for no sooner does frost appear than Cauliflower becomes comparatively useless. True, there are now hardier kinds than formerly, owing to the tender varieties of Cauliflower being constantly crossed with the more hardy Broccoli.

Cauliflower is distinguished from Broccoli by its being more tender and requiring protection during ordinary severe winters. The curd or flower is also much whiter than most kinds of Broccoli, although there are now some early kinds of the latter nearly as white as Cauliflower. Generally speaking, Cauliflower is not so useful as Broccoli, on account of its chief season being that in which other vegetables are as a rule plentiful. When, however, it can be got early in May and late in November, it is valuable, and forms one of the most esteemed dishes at those seasons of the year. Unlike Broccoli, Cauliflower requires to be sown at different times during the season—viz., from April until October (*i.e.*, if a continual supply through the summer and autumn months be required). It also has the advantage of turning in or forming heads in a shorter space of time than the Broccoli. Spring Cauliflower is as a rule the most esteemed, and is generally sown in such situations as will admit of the plants being protected during the winter months. In some localities no protection is necessary more than choosing the warmest and most sheltered parts of the garden for the seed-bed. We may here note that the first great thing in Cauliflower growing is to procure good seed true to name; and this can only be done by having it from respectable seedsmen, or saving it yourself, though the latter seldom repays the trouble it requires to harvest it properly.

**Sowing and Planting.**—To obtain plants to supply Cauliflower *in April* and May, sowings are generally made in August and *September in the open air,* on beds prepared for them by being enriched with good rotten manure. If, however, the ground be moderately rich already, manuring is unnecessary, as it is apt to promote a too vigorous growth in the plants, in which case they get too large before winter sets in, and consequently are not so conveniently protected during frosty weather as when they are smaller. When there are cold frames at liberty, it is advisable to sow a light or two, in order to make sure of having plants should the outdoor sowings fail, which is not unfrequently the case in hot seasons. Many sow broadcast, but we prefer shallow drills 6 in. apart, sowing the seed rather thinly, but in sufficient quantity to insure having enough plants.

After the plants are up, they should be thinned out and left 3 in. or 4 in. apart, the soil between them kept constantly stirred, and dusted over with wood-ashes or a little soot, to guard against slugs and snails, which pests are uncommonly partial to nice young Cauliflower plants. When the plants are large enough for transplanting, they should be carefully taken up by raising the ground with a fork, in order to preserve the roots from being broken. A wooden frame or brick pit are the best places in which to put them, but they are very often protected by hand-lights. A very good temporary frame may be made by stacking thick turves one upon the other, in such a manner as to allow of mats, straw-hurdles (which are the best), or other protecting material being placed over the plants during severe weather. Wherever they are planted, they should occupy a sunny situation, as much sheltered as possible, and be provided with good sweet soil; and if a little lime-rubbish be mixed with it, it will be found beneficial. They should be planted 6 in. apart each way if space can be spared, well watered, and shaded from the sun for a few days, after which time they must have all the air and light possible, and should not be covered up at any time one hour longer than is necessary to guard against frost and cold storms.

Where hand-lights are used, the best way is to sow at the time previously recommended, but, instead of pricking off into frames, the young plants are placed at once under hand-lights. In this instance, nine are left, and as they become too close, some are lifted and planted out under other lights until only three or four remain under each cover. Planted thus, they require much the same care as the others: a constant watch, and protection with litter, and a little manure-water in spring, being necessary. In some places they are, also, planted out from the seed-bed in the end of October to other beds, keeping the plants 4 in. apart each way. In these beds they are protected in winter by means of mats supported by hoops, and, in very severe weather, some litter is also shaken over the mats. This is an unwise practice, however, for, should the weather be severe for any considerable length of time, they must be kept dark, consequently they become weak and spindly, and are apt to suffer in a proportionate degree.

Where time and convenience can be commanded, the following is a certain method by which success may be attained :—

the seed in a frame in October, the frame being very gently heated by means of half-decayed leaves and decomposed frame linings mixed together and formed into a basis, 18 in. or 20 in. deep, for the frame. As soon as the plants come up and have attained a little strength, they should be thinned out and either transplanted into another similarly-prepared frame, 4 in. by 6 in. apart, or potted singly. In potting, use 3-in. pots and good loamy soil and sand; plunge the pots near the glass in frames, until severe frosty weather has arrived, when they should be taken and placed near the glass in Vineries or Peach-houses at rest, but from which frost is excluded, or they may be left in the frames and protected with litter. In the latter end of January shift them into larger pots, using a richer compost than before; and by the end of February or first week of March they will be fine plants for planting out in threes under hand-lights, or to shift into larger pots to be placed in late Vineries or Peach-houses, or under any old spare lights in turf-pits. Seakale pots—as soon as out of use—turned upside down, and filled with good rich soil, are famous for getting in the first early Cauliflowers under shelter.

Good Cauliflowers may be produced by wintering the plants out of doors. This is, however, chiefly confined to the southern and warmer districts of England and Ireland. For this purpose, seed should be sown at the usual time, and prepare a S.E., S., or S.W. wall border, say about 2 ft. wide from the base of the wall. Into this, prick off the plants about 4 in. apart each way in October, and allow them to remain there till February or March. If they are well sheltered, they do not require any care or protection, further than to keep them clear of the tree-leaves that will naturally collect amongst them, which, if allowed to remain, will bleach and weaken them—but, if convenient, a few sprigs of Broom or Spruce stuck in front of them will be of material benefit to them. In spring, they may be planted out like those already referred to; but for planting out in rich sheltered borders, and unprotected, they are much more suitable than any of those more carefully wintered. This method is almost the only one practised along the coast of the Moray Firth and for four miles inward.

In order to produce heads to succeed those from the autumn-sown plants it is necessary to make a sowing in February or March, on a gentle hotbed, or in pots or boxes placed in houses or pits where a warm temperature is maintained. As soon as the plants from this sowing are sufficiently large to handle they may be pricked off into boxes or pots 2 in. or 3 in. apart—or, better still, into vacant pits or frames. By the end of April they should be thoroughly hardened, and be in readiness to plant out on the first favourable opportunity that presents itself early in the month of May. They should be planted in as warm a border as can be spared for them, at a distance of 2 ft. apart each way. These will generally come into use in June. Other sowings should be made to succeed these during April and May in the open border, and planted out in June and July, in the same manner as those from the previous sowings, with the exception of allowing them a little farther distance apart, and they may be planted in open quarters instead of on borders. Sowings of Veitch's Autumn Giant may be made in boxes in October, and kept in a cool house through the winter, pricked off into other boxes in March, and placed in cold frames for a few weeks; finally planted in the open air early in June, they will produce fine heads in June and July, if planted in good soil and kept well watered during dry weather.

In hot, dry summers it is often difficult to produce really good Cauliflower. If May and June be not scorchingly hot, the earliest batch may turn out unusually good; but, under ordinary circumstances, as the summer advances they either flower prematurely, or, if the plants attain their full size, instead of forming close white hearts, they produce open unequally-shaped heads. For this the best remedy is manure and moisture. Irrigation, when applied to soils liable to burn up quickly, is a great source of fertility; but when it has to be carried out by means of the watering-pot, it is a very fatiguing and expensive operation. In unsuitable soils the best plan to ensure a supply of Cauliflowers during the hot months is to select the coolest piece of land that is available for the May and June sowings, dig out trenches the width of the spade and one foot deep, in the direction in which the rows are intended to run; put in the bottom of the trenches 6 in. of rotten manure, if so much can be spared, tread the manure down firmly, and fill in with soil to within 3 in. of the top; press the soil down with the head of a rake, so as to have a tolerably firm seed-bed, draw a shallow drill along each trench, and sow the Cauliflower seed thinly along the centre. When the plants appear, thin them out to 15 in. or 18 in. apart. As the plants advance in growth, draw a little soil around their stems, and mulch with manure, Grass, or anything suitable that is at hand. Such plants will grow on unchecked, and, if a watering should be necessary, being planted in trenches, the plants will get the full benefit of it. Another mode of planting Cauliflowers, where a maximum result is desired, is, after the land has been marked out in the usual way with a line, to dig out holes about 1 ft. square, and rather more deep, put a good spadeful of rotten manure in the bottom of each hole, return the soil, press it down with the feet, and dibble a plant into the centre of each space so treated. This of course must be looked upon as a special preparation for a particular crop, and in a soil with which it is difficult to deal. Sandy loams may be manured and dug in the hottest weather without any necessity to feel uneasy about obtaining the required solidity, for the first shower or a good watering will expel the air, settle the soil, and the plants will commence growth immediately. But other soils are quite different. In some places where the land has been dug deeply in summer, it would be altogether useless for immediate planting; and it is under such circumstances that the plan of digging trenches for such crops as late Peas, Cauliflowers, French Beans, etc., and placing the manure in the bottom of the trenches is so peculiarly beneficial. As a rule, never dig rank manure into any land that dries quickly, except in the autumn. Veitch's Autumn Giant is a good useful Cauliflower, and the Walcheren may be relied on for all seasons.

**Varieties.**—According to nurserymen's catalogues, there are a great many kinds of Cauliflower, all of which are highly eulogised; nevertheless, old and tried kinds should not be discarded. The Walcheren is, perhaps, the best of all for general purposes, and some even confine their supply throughout the season to the produce of this one kind. Of late years, however, Veitch's new Solid Late is a true solid white-curded sort, and a valuable and good improvement on the Walcheren for a late supply. The Early Cauliflower, or Early London White, as it is sometimes called, is another good sort, and the one generally used for the earliest spring crop. Large Asiatic is a stronger-growing variety of the Early London, producing a fine large, compact curd, and, if sown at the same time as the Early London, it will form a fine succession to it. Snow's Winter White is an excellent kind, and pretty hardy. In the market-gardens round London this is the kind used for affording a supply from the latter end of October till January. Severe frost, however, will prove detrimental to it as well as to other kinds; but, as a rule, it is the hardiest and most suitable for late work, and its quality is first-rate. With these four sorts, rightly treated, no garden should be without a good supply of Cauliflowers from April to Christmas.

There are, however, many other varieties of great merit. New Early Mammoth, or Frogmore Forcing, is a good variety, and is said to be a fortnight earlier than the Early London. Dwarf Hertfordshire, Early Alma, Nonpareil, and Dwarf Expert are also good varieties, and may generally be relied upon when obtained true to name.

**Cauliflower Culture in Market Gardens.**—This is a very important market-garden crop, and one to which many hundred acres of land are devoted in the vicinity of London. Cauliflowers were at one time all cut and sent into market; but now the entire produce of extensive fields is bought up for pickling purposes. For ordinary market use, earliness is the great end to be attained, for not only is the price for early produce better than that for late, but there is an advantage in having the ground soon cleared and ready for another crop. Market gardeners seldom make many sowings of Cauliflowers; one or two in autumn, and one or two in spring, being the usual number. The first autumn sowing is made out of doors, some time between the last week in August and the third week in September; and the second one, in frames, in the last week of September or first week in October. From these two sowings, Cauliflowers are obtained from the last week in April to the end of June. The first spring sowing, if the autumn one is a failure, is made in a frame in the last week of February or first week of March, or it may be made in the open border any time during the first fortnight of March; from this sowing a crop is obtained from the middle of June till August or September. The third sowing is commonly made in beds, in some open quarter, between the middle of April and the first week in May, in order to furnish an autumn supply.

Different market-gardeners have different times for sowing Cauliflowers, but it is universally understood that strong, grossly-grown plants do not stand the winter so well as medium-sized ones, and they are also more liable to "button." Moderate-sized plants are decidedly the best for mild winters, but in the event of very severe winters occurring, strong plants are the best. The first autumn sowing is made on a well sheltered piece of ground or a warm open quarter, in beds from 4 ft. to 6 ft. wide; and the majority of growers make this sowing in the second or third week of September. The young plants are allowed to remain in the seed-bed until the end of October, or even the middle of November, according to the state of the weather; the milder it is the longer the plants are left in the seed-beds, in which they are kept rigidly clean, and the soil kept loose amongst them by means of the hoe. In the event of frosty weather setting in whilst the plants are in the seed-beds, they are protected by mats supported on short stakes eighteen inches above the ground. Of these stakes, five rows are inserted in the beds—viz., a row on either side, another in the middle, and other two, one being on either side of the middle row. Sometimes a wooden board, about 10 in. or 12 in. wide, is set on edge along the centres of the beds, and two rows of short stakes are put in on either side to support it. Hoops and mats are also employed for a similar purpose. Where room is limited, and the weather appears mild, young Cauliflowers are often wintered in the beds where they were sown, or they are pricked off into raised beds of light soil not likely to be soaked with wet in winter. Here they are sometimes left unprotected, and at other times they are covered with hoops and mats. Continued dampness of soil and atmosphere is their worst enemy, as it induces growth so soft that it cannot withstand frost so well as that produced on high and dry ground. The frames in which Cauliflowers are wintered are put up in the middle of October in a sheltered spot sloping to the south. They are generally those in which Cucumbers have been grown during summer, and after they have been fixed in the positions they are to occupy, they are filled to within 8 in. of the top with ordinary soil firmly trampled down with the feet; over this hard bottoming 3 in. or 4 in. deep of a better kind of soil is sifted, and in this the Cauliflowers are planted 3 in. or so apart. Thus circumstanced, they are allowed to remain until the February following and early part of March without any further care beyond that of closing the sashes to exclude frosts, cold winds, hail, or rain, tilting them up at front and back during favourable weather, and on very fine days drawing them off entirely. Cold rains are very injurious to Cauliflowers, but a warm shower in February benefits them. Sometimes the plants grow so strongly—not a good sign—that their leaves touch or press against the sash when that happens the sashes should be tilted up at front and back, night and day, with pieces of wood or brick, otherwise frost would injure such leaves as touch the glass. Dry sand, kept in a shed for the purpose, is scattered amongst the plants two or three times while they are in frames, in order to obviate damp; and such plants as show signs of "buttoning" are immediately pulled out to give the others more room. Besides wintering them in frames, hand-glasses are extensively used for a similar purpose. Where they are employed, an open field or quarter is lined off in rows 6 ft. apart, intersected by others either 6 ft. or 4 ft. asunder. At every intersection nine Cauliflowers are planted in a sufficiently small space to be conveniently covered with cloches or hand-lights, which are immediately placed over them, and a little earth is drawn around the base of such lights, so as to shut up all apertures, and turn aside cold currents of wind. This is done about the end of October and beginning of November.

**Intercropping and Treatment under Hand-lights.**—The empty space between the rows of hand-lights is planted with Coleworts, three rows being put in the widest of 6-ft. lines, and two rows in the 4-ft. spaces. In spring these Coleworts are either thinned out, or entirely removed for bunching, and a crop of Cos Lettuces is planted in their place. As soon as the Cauliflowers have become established they are allowed abundance of air, and otherwise treated the same as those grown in frames. The end of January and early in February is the usual time for planting under hand-lights; but in this case the plants are transferred thence from the frames and planted as already described. When the plants become too thick they are all lifted from under the hand-lights except three or four, and planted in open quarters, or under hand-lights. Market-gardeners generally begin to cut from plants raised in this way some time in the month of May, according to the season.

A third crop comes in three weeks after the second, and is either made from the late autumn sowing, or by means of plants wintered under hoops and mats in the open ground. A fourth plantation, which soon follows, is made from whatever plants are still left in the frames or outdoor beds. Cauliflowers are often planted on ground cropped with Radishes before the latter crop is marketable; and by the time it is so, and cleared off, the Cauliflowers will have gained good strength, when the ground will be intercropped with Lettuces. In other instances, fields are marked off into beds 5 ft. wide, with 1-ft. alleys between them, and these beds are sown with round-leaved Spinach. As soon as this is done, three rows of Cauliflowers are planted along the beds. The latter outgrow the former, which, by continual picking for market, is kept in check until it is eventually exhausted, leaving the Cauliflowers masters of the field. Autumn crops are obtained from spring sowings, which are thinned out a little in the seed-beds, and, when large enough for handling, are planted where they are to remain permanently. Should the weather be dry at planting time, about half a pint of water, or a little more, is given to each plant, and the sodden soil is soon afterwards freshened up by the hoe,—thus, in some measure, preventing evaporation. Late Cauliflowers are nearly always intercropped with some other vegetable, such as Lettuces, French Beans, Celery, Seakale, etc. Some large growers, however, depart from this rule, and save much labour ; for if intercropping be practised, people must be employed to keep down weeds by means of the hoe; but when Cauliflowers alone occupy the ground, horse-hoes can be freely worked among the rows. The Early Erfurt or Early London White is the variety used for the first crop by most market gardeners, but some grow the Walcheren for that purpose. The Walcheren is the kind almost entirely grown for use after June, because it suffers less from drought than any other sort, and is not liable to "button." Snow's Winter White, an excellent sort, is, as a rule, regarded as a Broccoli; nevertheless, it has fine white, solid heads, and is largely grown to succeed the Walcheren, being hardier than that sort. Snow's White, if sown together with the Walcheren in April or May, makes a fine succession to it, and comes in usefully till January.—*D. Guiheneuf.*

## Cabbage

(*Brassica oleracea capitata*).

The Common Cabbage, as every one knows, is grown in every garden, however small. It is, as a rule, little esteemed in private establishments, excepting for the servants' hall. Cabbage Greens, or the young hearts that push from the stump after cutting the head, are generally used for the more delicate dishes. Young spring and autumn Cabbages are extensively grown for market, and realize high prices when in good condition. Summer Cabbage is brought largely into market, but when other vegetables are plentiful it is little thought of, although in dry summers high prices are sometimes demanded for it.

**Sowing and Planting.**—The most important sowings of Cabbage are those which are required to form a supply through the spring and early summer months. These sowings should consist of several varieties that naturally succeed each other in coming into use. However, very early kinds should not be sown too early in the summer, as there is a possibility of their running to seed, which they are sometimes apt to do in dry weather. From the middle of July to the middle of August is the time usually chosen for this operation ; but much will depend upon the season, soil, and locality. The beginning of August will in most places be found to be the best. Plants from seed sown at that time are generally ready to plant out by the end of September or beginning of October, and they have then ample time to get established before the winter sets in.

For autumn supply a sowing should be made from the middle of March to the beginning of April, and planted out in June and July,—they then come into use in August and September ; and if a second and rather larger sowing be made in the last week in April, and planted out in July and August, they will come into use from October to December; and a small sowing of a dwarf kind that hearts quickly, sown in May, will form nice little heads for use in January, which, with the Greens produced from the stumps of those that have been cut, will last until the spring Cabbage comes in.

Cabbage plants intended to stand the winter are best planted with a crowbar in firm undug ground, such as has recently carried a crop of Onions, or other surface-rooting plants that have not impoverished the ground too much. The ground must of course have been well manured for the previous crop to Cabbage, or good results cannot be expected.

A firm, stiff, rich soil is best for Cabbages; for if grown in loose, light soil, they do not "heart" so well, neither is the quality so good. Cabbage seed should at all times be sown on light rich land, and the plants should not be allowed to overcrowd each other before they are put out, but as soon as large enough to handle be pricked out 6 in. or 8 in. apart, or be thinned out, and the remainder transferred to their final positions as soon as they are sufficiently large. The distance to plant them apart depends upon the variety grown; but 2 ft. between the rows, and from 15 in. to 18 in. from plant to plant in the rows, will generally be found sufficient space if the ground be in good heart.

**Varieties.**—There are a great many varieties of Cabbage now in cultivation; many, however, differ in name only, and it is best to select only those that have been found to be good and reliable kinds. Atkins' Matchless, Battersea, Early York, or Barnes, and a dwarf-growing variety called Early St. John's Day, are the best for early crops, and may be used for Coleworts. For general crops the following may be fully relied on as giving entire satisfaction:—Enfield Market, Wheeler's Imperial, Nonpareil, and Wheeler's Cocoa-nut; and a new kind called Carter's Heartwell is a first-class all-the-year-round Cabbage.

**Cutting Cabbage.**—A little more attention might be advantageously paid to this subject than is generally the case; for although Cauliflowers and Brussels Sprouts cannot always be had just when wanted, tender Cabbage may be had with very little management. Supposing we plant Cabbages in autumn, they will come into use nice and tender towards the beginning of summer; but if the household be generally not able to use them as fast as they grow, the heads are allowed to swell until they burst, or go to seed or rot, and eventually become quite useless for cooking purposes. In gardens from which large establishments have to be supplied, Cabbages are generally wanted as soon as they are ready, and a number of heads are cut daily; but the experienced gardener does not cut the head off at the surface of the soil, but just at the neck, leaving a few of the bottom leaves. Consequently, before the quarter has been cut over the first-cut plants have made another break and become furnished with a whole cluster of young succulent heads, which fold immediately, and are fit to cut before the first heads are quite finished. The plants will even break and fold a third time, and in this way a plot of Cabbage may be made to afford a supply nearly all the year round. The vigour, free growth, and tenderness of the heads will be greatly promoted by frequent stirrings of the soil between the rows, and mulching with any loose material, such as short Grass or leaves, at command. Cut your Cabbages, therefore, if you have to give them away to your neighbours, before the heads get over-ripe and useless, and you will have a continuance of young and tender heads, which are greatly to be preferred to those which are large, white, and hard.

**The Thousand-Headed Cabbage.**—A correspondent in the *Garden* writes of this as follows:—"I know of only one garden wherein this is grown as a table vegetable, and if I may be allowed to make comparisons, grown and as served on the table in this particular instance, it is one of the most valuable of all the rougher kinds of Brassicas, more especially for use in winter. The plant is thoroughly perennial when systematically cut from for the kitchen, though whether, when grown for seed only, it is so, I am not prepared to say. In the case I have now in view it is kept going by an annual insertion of 'slips' roughly snapped off and inserted by a farm-labourer, and there is only one difficulty—and that a small one—connected with its management. It is this: the plant stands a long time on the same ground, and consequently the weeds have too fine a time of it, the ground soon becoming matted with Knotgrass, Pellitory, and the rest of the delectable kindred that love hard ground amongst standing crops, their proper collective name being Legion. But the way out of this difficulty is easy enough, as I pointed out to a friend in Cornwall the other day. Instead of growing a piece, and having thousand-headed weeds as well as Thousand-headed Cabbages, grow a row here and a row there, in every case as a dividing line, just as you might have a row of Currant-trees or Artichokes. Then the weed worry is at an end, and it is much more convenient in sloppy winter weather to go in with a basket and nip off a bushel of tops. While on this subject I am bound to remark that in Cornwall it is not unusual to propagate Brassicas by slips; and it seems to me but as yesterday when the Vanack Cabbage was grown in this way, and hence was unknown to the seed trade. Does anybody know of the Vanack now? Some of our friends may be shaken by a flash of thought on the possibility of raising Cabbages from cuttings as a possible routine of practice everywhere; but let them become calm on our recommendation. In a place where every cloud that appears dissolves in rain, Brassicas may be easily multiplied, as the cottager does his or her Wallflowers; but where the clouds behave themselves better, and now and then pass over without weeping, the case is different. It is a matter very much of atmospheric humidity, as, it may be well to add, is the immortal Cornish Cauliflower."

**Wintering Cabbages.**—Persons interested in the preservation of Brassicaceous crops from great cold may find the following account of how that can be effected suggestive. Cultivators near Philadelphia preserve from one to twenty acres of Cabbages thus:—

Commencing on one side of a field—if but few heads have been already cut out—the third row is all pulled by the roots and laid in the adjoining rows; then with a two-horse plough, run a furrow where the Cabbages stood, returning in the same: if it be desired to keep Cabbages until spring, it should be about 6 in. deep. Then, while men on each side pull the Cabbages from the two adjoining rows and place them and those before pulled—with the roots up—close to this furrow, a man stands astride it, takes them by the stalks and sets them in the furrow (by drawing them up it a short distance, from front to rear, the leaves will be drawn under the head). When these rows have been thus gone over, the next five—more or less, according to the capacity of the furrows to hold them—are similarly handled. When a number of such furrows have been filled, one strong horse is hitched to the plough, and a furrow thrown up on each side of the Cabbages thus set; a ridge is thereby made over the heads that will throw off the rain. Another method, much employed in France, is as follows:—The Cabbages are stripped of all their green leaves, and the rounded heart or head is hung up to dry for some days in an airy place. They are then very finely sliced with a sharp knife, and placed in thin layers in sieves, which are hung up in an airy place. The sliced Cabbage is also stirred every day, in order to facilitate the absorption of its moisture by the air. After this the sieves are exposed for some time to the heat of a cool oven, until the contents are thoroughly dried. Cabbage treated in this way does not change its colour, and very much resembles Vermicelli in appearance. It loses about one-third of its bulk in the course of the process. When quite dried it is kept in bags hung up in a very dry and airy place. It should be examined from time to time, and if there be any appearance of moisture, it should be again placed in the oven. If this be not done, it soon rots. In cooking, it is first soaked for some time in water, and then boiled like fresh Cabbage, from which it is very difficult to distinguish it in taste when served up.

**Grafting Cabbages.**—A correspondent of the *Gardeners' Record* states that he has grafted Cabbages successfully. "For this purpose I made choice," he says, "of two varieties of the Cabbage—Enfield Market as the stock, and the Red Dutch as the graft, choosing the darkest plant that my seed-bed then afforded. The grafting was performed at the end of April, 1872; they united very freely, and the scion grew very luxuriantly. It is well known that, under ordinary circumstances, each of these Cabbages produces very close, firm heads, but in this case the graft showed no inclination to do so; it remained open, with a slightly apparent dash of stock blood. At the end of spring, 1873, it threw up a very strong, straggling, flowering stem, from 7 ft. to 8 ft. in height, the individual flowers being particularly large, but by no means abundant; consequently the quantity of seed ripened was not large. During the first week of February, 1874, a portion of the seed was sown, the result of which is that I have obtained a somewhat interesting lot of Cabbages, Kale plants (very dark and curled, nearly, if not altogether, as dark as such as Dell's and Belvoir Castle Beet), Savoys, and Red Cabbage, a considerable number partaking of the character of the stock family. Although imbued with the blood of the graft, that of the stock predominates in the majority of cases, and, strange to say, all the progeny appear to be more or less deficient of the tendency to Cabbage.

**Cabbage in London Market Gardens.**—What is called the Enfield Cabbage is that which is used in the market gardens about London. It is one of the oldest in cultivation, and one of the best; and as growers of it generally save their own seed, they take particular care that their plants of it are not crossed with other sorts. The sowing for the principal crop of this Cabbage is generally made on St. James's Day, the 25th of July, or some time between that and the middle of August; and if the sowing be made on poor ground so much the better, as in that case the plants come up stocky and hardy, and stand the winter well,—whereas, if made on rich ground, a soft rank growth is produced, which is much more easily injured. This sowing is, as a rule, made in beds 4 ft. wide—a distance found to be convenient for weeding and hoeing amongst the plants. By the time the latter are sufficiently strong to be transplanted, the Potato or Onion ground is ready for the reception of a first batch of them; and on that being cleared of Celery, French Beans, or Vegetable Marrows, another plantation is generally made. Every empty space, under fruit trees or elsewhere, is also planted with Cabbages. In planting, the ground is lined off into rows 35 in. apart, and in these the plants are put in 15 in. asunder. Between every two rows first planted another is now put in with less care, thus making the plants stand 15 in. apart each way. Early in spring every alternate line of plants, and also every other plant in the lines or rows left, are lifted and sold as Coleworts—*i.e.*, young open Cabbages—a state in which they are preferred by many to the hearted kinds. This allows the permanent crop plenty of room to come to maturity. With a view to subsequent plantations, which are made all through the winter wherever ground is vacant, the young plants in seed-beds are removed and pricked out into others a little further apart, in order to keep them in good condition for planting out as long as possible. In this way, indeed, many of the plants are kept till spring, when they are transplanted to succeed those planted out in autumn, and to come in before the produce of the spring sowings, made late in February or early in March, to furnish Cabbages from June to August. The plants from this sowing are put out in rows 2 ft. or 2½ ft. apart, and in the intervening spaces are set lines of Lettuces, a plant of which is also between every Cabbage in the row. If thought necessary, another sowing is made in the end of March, or in April; and sometimes a bed is sown in May, when what are called Rosette Coleworts are sown. As the latter are, however, chiefly grown for late autumn and winter supplies, Cabbages are seldom sown after March. Moreover, when Peas, French Beans, and Vegetable Marrows are in, there is little demand for Cabbages.

Red Cabbages are sown in March or on St. James's Day, and the plants are put out in rows from 3½ ft. to 4 ft. apart, and stand about 3 ft. asunder in the rows. As this crop stands until the heads are large and solid, a piece of rich land is devoted to it, and intercropped with Potatoes, ordinary Cabbages, Lettuces, French Beans, or other vegetables of that kind. The produce of the July sowing is generally considered better than that of spring.

**Coleworts.**—These are simply small-hearted Cabbages, pulled for market when about half-grown; any small quick-hearting variety of Cabbage may, therefore, be grown for this purpose. Some kinds, however, better deserve the name of Coleworts than others, and these are often left until they heart. Among them are the Rosette, a valuable kind, usually sown in May for use between October and Christmas; and Cock's Hardy Green Colewort, a desirable sort for winter use, as it is hardier than the Rosette. Another sort, called Blue Colewort, is largely grown by some market gardeners; but it is a kind which is apt to "run," and is generally grown for the November crop. For spring Coleworts, only the thinnings of the Fulham Cabbage are used. The Rosette is, perhaps, the greatest favourite in the market, its beautiful white heads, when bunched, having an attractive appearance; but, as regards quality, nobody would eat the Rosette who could get Cock's Hardy Green—*i.e.*, if they were acquainted with the respective flavours of the two varieties. A sowing of the Rosette is usually made in May, in beds in an open piece of ground; and, when up, the young plants are thinned with small hoes. The strongest plants are first selected for transplanting, and are put in chiefly as catch crops between other vegetables. As soon as fruit bushes have been cleared of their crops two rows of Coleworts are planted between them; they are also planted under fruit trees, no matter how large the trees may be, and also between rows of Moss Roses. The space between Celery ridges is likewise generally planted with Coleworts, as is also that between Asparagus ridges, the edges of which, too, are often cropped with Coleworts. Between the rows of French and Runner Beans, and late Savoys, this Colewort is likewise planted, and, in fact, like Lettuces, it is planted in every empty space where there is a probability of its growing to a useful size. Whole fields, too, are sometimes cropped with it, and are cleared in good time for winter Radishes. Cock's Hardy Green Colewort more resembles an ordinary Cabbage than the Rosette, and, being hardier, is sown a month or six weeks later, so as to form a succession to that sort.

**Red Cabbage** (*Brassica oleracea capitata rubra*).—Grown for pickling purposes, and comes into use from July to October. Good solid heads fetch good prices in the markets. The seed is generally sown in August and September, but some growers sow in heat early in spring. The former is, however, in some cases the better, inasmuch as the heads are not generally so coarse as those produced from plants put out in the spring and grown more rapidly. They require exactly the same mode of culture as the Green Cabbage.

## The Savoy

(*Brassica oleracea bullata major*).

THIS, which forms a connecting link between the Cabbage Sprouts and the Brussels Sprouts, may be obtained either with firm heads like Cabbages, or in the form termed Savoy Coleworts, which means half-grown heads. These are more esteemed than those with large heads, as they make a neater dish. Of Savoys there are several varieties. The Drumhead, which attains a large size, and the Dwarf Green Curled and Early Ulm, are excellent dwarf kinds, suitable for small gardens. Savoys may be obtained in perfection from September to the end of March ; but are considered to be at their best during October and November, and are better flavoured after frosty weather than before it. To produce Savoys for early winter use the seeds should be sown by the middle of March ; and, if a succession be required after Christmas, another sowing should be made when the first is peeping out of the ground. The Savoy, like all the other members of the Brassica family, enjoys good food, and, if planted on rich soil, will well repay any extra care that may be bestowed on its cultivation. A good soil, well manured, will produce them in perfection ; and, if the situation happen to be a dry one, liberal supplies of manure-water should be given during the growing season. The Drumhead variety should be planted in rows, 2 ft. apart and 18 in. asunder in the rows, and the Dwarf Green and the Early Ulm should stand 20 in. row from row. Savoy Coleworts may be obtained by selecting the very refuse of the seed beds, and planting them out, the second week in August, in drills 18 in. apart and 9 in. asunder.

## The Capsicum

(*Capsicum annuum*).

THERE appears to be some uncertainty as to the real native country of the Capsicum or Hot-pepper (Peperoni of the Italians, Piment of the French), now so universally spread over all tropical countries. Although long known under the name of Indian Pepper, it appears not to be indigenous in Asia, and there is no authentic record of its cultivation in Europe before the discovery of America. It is said to be really wild in that continent, and Cæsalpin and Clusius, late in the sixteenth century, both speak of it as introduced from thence. Yet, in the time of Matthioli, early in the same century, and, consequently, at a period when very few of the natural productions of the New World had been transplanted to the Old, we find at least three varieties well-established and abundantly cultivated in Italy, under the name of Indian Pepper—which is hardly probable if it had been really introduced from America, then so recently discovered. A curious instance of the slowness with which the use of culinary vegetables is spread is afforded by the large green mild variety of Capsicum, which is so much eaten over a great part of Spain and some of the adjoining French departments. It was carried by the Spaniards into Naples during their dominion in the sixteenth and seventeenth centuries, and has ever since remained in common use there, without spreading farther. It makes an excellent salad, having all the flavour of the Capsicum without the slightest pungency.

**Cultivation.**—Capsicums may in some parts of England be successfully grown in the open air, but where large supplies are needed it is advisable to have some under glass also, in case of failure of the outdoor crop. The seeds should be sown early in April, on a gentle hotbed, or in pots or pans, well drained and filled with sandy loam and leaf-mould in equal parts ; and if plunged in a gentle bottom-heat they will germinate more quickly, and the plants will be much stronger, than when only placed on plain shelves, etc. As soon as the plants are large enough they should either be potted off singly into 4-in. pots, or three plants placed triangularly in 6-in. or 8-in. ones. In the latter case it will be found best to only fill the pots three-parts full at first, with a view to earthing them up when the soil becomes full of roots. In order to have dwarf, stubby, and healthy plants, it is necessary to place them as close to the glass as possible, in a temperature of 65° or 70°, giving them liberal supplies of water and admitting air freely on every favourable opportunity. Plants that are potted into 4-in. pots should not be allowed to become pot-bound, but be shifted into 6-in. or 8-in. ones.

Those plants that are to be turned out of doors should be gradually hardened off towards the latter end of May, and in June they may be planted out into a warm border under a south wall. They should be planted 10 in. or 12 in. apart, well watered when necessary, and in the event of cold weather setting in should have some slight protection afforded them ; and if the season be favourable, they will ripen their fruit from the end of August to the middle of September.

Where, however, there are pits or frames available for growing Capsicums, they are the best places in which to grow them. Frames recently cleared of early Potatoes, etc., answer the purpose capitally. The plants should be put in 1 ft. apart, kept well watered at the roots, and be frequently syringed overhead on sunny afternoons, and shut up with plenty of sun heat. When in flower, abundance of air must be given them, to assist them to set their fruit, after which time liberal supplies of manure-water may be given them with advantage. By adopting this method it is astonishing the quantities of fine large fruit that can be gathered from a three-light frame.

**Soil, Varieties, etc.**—There are now many varieties of Capsicums, but the kinds most generally grown for culinary purposes are the Long Red, Long Yellow, and Small Red—the tallest being the hottest, and are sometimes called Chilies. The pods of these varieties are used in a green state for pickling, when ripe for mixing with other *things in sauces*, etc., and when in a dry state are ground and used *as Cayenne pepper.*

When Capsicums are planted out of doors or in frames, a light, rich soil, composed of turfy loam, rotted leaf-mould, and cow-manure in equal parts, with a little silver sand added, is best suited to them; but when grown and fruited in pots, a more solid soil will be found best—which end can be gained by dispensing with the leaf-mould.

Capsicums, although generally cultivated for culinary purposes, are far from being uninteresting as decorative plants. We have several species in our gardens, all bearing bright scarlet or yellow fruits, which contrast well with their deep-green foliage. Yellow Gem, a dwarf-habited plant, with large deep-green leaves and bright orange-furrowed, top-shaped fruits; Prince of Wales, a most elegant form, having slender branches, laden with a profusion of small, oblong, sharp-pointed fruits of a pale-yellow colour, and a plant that well deserves culture as one of the prettiest of all the yellow-fruited kinds; and Princess of Wales, which is the result of a cross between the last-named varieties, and is more robust than either, with fruits 1½ in. long, top-shaped, and furrowed, the colour being intermediate between bright orange and pale yellow. These kinds are certainly worth growing for purposes of decoration only, and if grown dwarf and shrubby, the plants are very useful as well as beautiful, inasmuch as they last a considerable time when placed in a moderately cool house and kept well supplied with water. There are also several other valuable varieties for this purpose,—namely, Bird's Eye (very pretty), Cherry, Square, and the largest of all the Capsicums, the Monster. Well-ripened pods of Capsicums will keep good for several years if placed on a dry shelf, and the seed will germinate at six or seven years old if kept in the pods until it is sown.

**Insects, Diseases, etc.**—The principal enemies of the Capsicum are green fly and red spider: the former may be easily kept in subjection by fumigation, and the latter by a free use of the syringe on the foliage, and maintaining a warm, humid atmosphere in the house in which they grow. Those planted out of doors are generally most affected by red spider. Their position being such as will not admit of those means recommended being employed, the only way in this case is to give the plants frequent waterings overhead and at the roots, and do all that is possible to promote a free and luxuriant growth. Curl in the leaf and fruit may often occur in outdoor plants in the autumn; this is, however, more or less occasioned by the cold nights, following days of extreme heat. The only remedy is to shade slightly during the day, and afford a warm covering at night.

## The Cardoon

### (*Cynara Cardunculus*)

THIS is a native of South Europe, and in appearance somewhat resembles the Artichoke; its flowers, like those of the latter, are of a beautiful bright blue, but the foliage of the Cardoon is more glaucous than that of the Artichoke. The Cardoon is largely grown by the French, who prepare it in such a manner as to render it one of the most delicate of vegetables. The Cardoon, if treated in the same manner as Celery, will generally be found to succeed : the only difference there is exists in the blanching, which requires rather more care and trouble than are generally bestowed upon Celery. Thorough blanching is, however, essential, in order to bring out the delicacy of flavour possessed by the Cardoon, without which it is worthless. It is better to have small heads well blanched and crisp than to have large rank ones half blanched, and consequently tough and strong. In order to have good tender heads, it is necessary to grow the plants from the beginning to the time of blanching without a check, and this can only be done by planting them in deep, rich soil, and keeping them well supplied with water at the roots during dry weather.

**Sowing and Planting.**—Where Cardoons are in demand early in winter, it is necessary to sow seeds of them in heat early in March, and to transplant in either May or June, according to the weather. For this purpose seed may either be sown in small pots and placed in a warm house, or sown in drills 4 in. or 5 in. apart in a gentle hotbed. The former plan is, however, considered to be the best, inasmuch as the plants can be more easily removed when required to be hardened off, and they are not so liable to a check when transplanted as when lifted out of a bed. The best-sized pots for the purpose are 4-in. ones, in each of which should be sown four or five seeds, thinning out the plants as they advance in growth, and finally leaving only the strongest one. They should be placed close to the glass, where they will get plenty of light and air to keep them strong and stubby, gradually hardening them off early in May; and towards the end of the month they may be transferred to the trenches in which they are to grow if the weather be favourable, planting them from 2½ ft. to 3 ft. apart in the row. It is a bad practice to sow too early, as the plants become pot-bound before they can be planted out, and consequently checked in growth. A second sowing may be made in May in open trenches, and the main sowing early in June. The trenches should measure at least 4 ft. from centre to centre, and be dug 2 ft. wide and 18 in. deep. Into the bottom of these should be placed 2 in. or 3 in. of good rotten manure, which should be dug in with a fork, and well incorporated with the soil in the bottom of the trench. The seeds should then be sown in patches from 2½ ft. to 3 ft. apart, and slightly covered with fine soil well watered, and flower-pots should be placed over them until the plants are up, when they may be removed, and the weakest plants gradually thinned out, eventually allowing only the strongest to remain. The subsequent treatment consists in keeping them well supplied with water at the roots until the end of September, when they will have nearly completed their growth, and when they will require moulding up. Those planted earlier will, however, be ready before that time, and should be earthed up as early as possible—the *aim in this case* generally being earliness rather than large heads.

***Earthing up.***—This should be performed on a fine day, when the foliage of the plants and the soil are dry. The leaves should be carefully brought to an upright position, and then placed neatly together and tied with broad pieces of matting. A good armful of dry hay or litter should then be placed round the base of each plant, and secured by strong haybands being wound round it, gradually narrowing to the top, leaving only the tips of the leaves bare. This done, the soil between the trenches should be turned over and well broken with the spade, and afterwards placed equally and firmly round the plants, forming an even ridge by beating the sides with the back of the spade. The plants will be well blanched and fit for use four or five weeks after earthing. Blanching may also be done by placing a drainpipe over the plants, after tying the leaves closely together, the apertures between the plants and pipes being filled with sand. This plan, though a good one, is generally considered too expensive where many plants are grown. Many lift their Cardoons on the appearance of severe weather, and place them in dry cellars or sheds from which frost is excluded. This is, however, really unnecessary so far as the plants are concerned, as they can be effectively protected by placing litter, etc., along the ridges ; but there is one great advantage in lifting them, and that is, they are easy to get at during hard weather, whereas those left out of doors sometimes cannot be dug out without a great deal of labour.

**Varieties.**—There are several varieties of Cardoons, the principal ones in cultivation being the Spanish and common kinds. The former has large, spineless leaf-stalks, which are tender and solid when cooked. The common Cardoon is not so good, inasmuch as the plant is more liable to run to seed, and is not so tender when cooked. There are also the Tours, the Red-stemmed, and Purvis Cardoons. The Tours variety, which is extensively grown in France, has leaf-stalks thickly set with long, sharp spines. The French prefer this variety to all others, on account of its large, thick, tender ribs ; and the plant is hardier, and not nearly so liable to run to seed as the other kinds. Cardoons are generally trimmed, washed, and cut into small pieces, say from 4 in. to 6 in. long, and put into a saucepan of cold water. When the water boils they are taken out, and the skin removed by well rubbing them with a dry cloth. They are then washed again, and boiled until tender in good stock or broth, and served hot with brown sauce. Marrow, placed round them when served, is a great improvement.

## The Carrot

### (*Daucus Carota*).

THIS plant grows wild in England and in many other temperate countries, is widely distributed over calcareous districts, in meadows, pastures, grassy banks, and by roadsides. It abounds in deep sandy soil, but is rarely found in poor ground ; and these facts must be well remembered in cultivating the garden varieties. This root has been cultivated from the remotest times—for so long a time, in fact, that not even an approximate date of its first occurrence can be fixed. This has led many horticulturists to believe that the garden varieties and the wild Carrot are two distinct species; but many arguments can be advanced against such a theory. The ancient Greeks and Romans cultivated Carrots, which led some authors to argue that the garden Carrot was a native of Southern Europe; but it is quite natural that the extraordinary skill and intellectual superiority of the Greeks should have enabled them to improve the wild Carrot with success, and to obtain roots similar to those now cultivated with such care all over the world. From Greece it found its way to the islands in the Mediterranean, as well as to Italy and Spain, in which country it has been cultivated for many centuries. Then sprang up the celebrated Candie Carrot; but the famous Gerarde hit upon the truth when he alleged that the Candie Carrot was not only grown in Candia, but was found wild on the mountains of Germany, France, and Switzerland; had Gerarde persevered in his researches, he would have found it growing wild in England as well. Another proof of the origin of our cultivated Carrots is, that roots similar to the garden kinds have been obtained from the wild Carrot by the late M. Louis Vilmorin, who, after several skilful selections, succeeded in giving fixity to many varieties of different colours, which are now well fit for table use. It has been said that the flesh of these new Carrots was more fibrous and less well-flavoured than that of the old varieties; but, when they have had the advantage of as lengthened a period of cultivation as the older kinds, they will probably be as fine as, and perhaps superior to, the latter. Although Miller says that, after cultivating the wild Carrot during twenty years, he did not see any improvement, it was no doubt because he did not act throughout with the necessary care—such selections requiring a good deal of patience, knowledge, and skill. By going attentively through a field of Carrots, especially the white and yellow varieties, many plants will be found showing a tendency to return to the wild kind, and this is commonly the case with the long purple Carrot. As a proof of this, it may be mentioned as an established fact that, if a single root of the best sort be planted in a field among wild Carrots, the produce of the seed the following year will have much degenerated; and, should the worst plants of the seedling be selected and submitted to the same process for many years, the entire stock will, in course of time, completely revert to the wild Carrot type. Gardeners are well aware of this, and are very careful in planting their seed-bearing stock. The leaves of the Carrot are very ornamental; it is said that they were formerly used for adorning ladies' hair. If in winter a top of a Carrot be cut and placed in water under glass, leaves will spring up that are similar in appearance to a Fern, and are valuable for decorative purposes. Artificial flowers are also made from roots of the cultivated Carrot; and vegetable Ranunculuses may thus be obtained without any colouring. These flowers look very pretty on dishes on a dinner-table, and others similar in character may be obtained from Beetroot, Radishes, and Turnips.

**Uses.**—The Carrot is one of the most useful plants in domestic economy, inasmuch as it furnishes throughout the whole year a vegetable that is both wholesome and palatable. Its uses are very various, and it is found alike on the tables of the rich and poor. Its culture, too, is by no means difficult; and its produce, although generally inferior in quantity to that of Mangel, and sometimes of the Turnip, is superior to these roots in nutritive qualities. The French, who are the most difficult to please in respect to this vegetable, never make use of field varieties for cooking, except in cases of necessity. In France, also, where its cultivation is most extensive and the best carried out, all the known varieties are more or less made use of according to their value; but the culinary kinds are grown everywhere, even by the poorest people. Belgium, although having originated several varieties, is still far behind as regards varieties of the Carrot, inasmuch as several field kinds are still largely used there for culinary purposes. However, the culture of each variety is carried to perfection in that country. England is in many respects the most backward in the culture of Carrots—for culinary purposes at least. The varieties grown in this country are less numerous, inferior in quality, and badly grown, compared with French kinds. In gardens this is most observable; and the consequence is, the London markets are stocked chiefly with the Surrey Carrot, a tough variety, without flavour, and with a woody heart. It is, moreover, difficult to cultivate, on account of the deep soil it requires; while, on the other hand, the finer cooking varieties accommodate themselves thoroughly to soils of medium depth.

**Varieties.**—French Forcing Carrot, a French variety, the smallest and earliest Carrot, chiefly used for forcing. It is a great favourite among the market gardeners on account of its extreme earliness. The root is from 1½ in. to 2 in. in size, nearly round, and terminates in a very fine tail. It is pale straw-coloured when grown under glass during the winter, but scarlet when raised in open ground. The flesh is very tender and finely flavoured; and it has scarcely any heart. This variety is extensively used on the Continent, and its cultivation ought to be much more wide-spread in England—affording, as it does, all the year round, a fair supply of fresh Carrots. Any one visiting the Halles Centrales at Paris, in springtime, cannot fail to notice the cart-loads brought every morning by the market gardeners to that market, as early as February. Recently, bunches of this variety have made their appearance in Covent Garden Market, but the freshness of such tender roots is spoiled by their journey from Paris to London. This valuable Carrot ought to be used only for forcing, and should never be grown in the open ground. Sowings should be made on hotbeds having a medium temperature, from November to February, for use from February until May. For early crops sown in warm borders, however, the Scarlet Horn will be found to be far better adapted. Market gardeners sow the Early French Forcing Carrot in August and September, protect the roots in winter, and sell them in spring for newly-forced Carrots, to which they bear some similarity after a sharp brushing before they are sent to market; but the difference may be easily detected by their deep scarlet colour, and the leaves being entirely stripped off. Special attention should be paid to this variety, which really deserves general cultivation. The following are its synonyms: French Forcing Carrot, French Forcing Horn Carrot, Very Early Forcing Carrot, Very Early Scarlet Horn Carrot, Very Early Short Horn Carrot, Early Forcing Horn Carrot, Very Early French Carrot, etc.

Scarlet Horn is an early variety, and one most generally cultivated for the first crop in the open ground. The root is deep scarlet, 2½ in. to 3 in. long, and 1 in. to 1½ in. thick. The flesh is very tender, and highly flavoured. It can be used for forcing exactly like the French Forcing Carrot, but being of a larger size it is not quite so early; therefore the best time for sowing is in February, on a warm exposed border; and, if well protected in case of severe weather, a fair crop of new Carrots may be expected by the beginning of May. Sowings made subsequently, from March to May, will afford a fair supply during the whole summer where large roots are objected to. On account of its small size it is not suitable for winter storing. This kind is often mistaken or sold for the last-mentioned, although the two plants differ much, both in size and earliness.

The Intermediate Scarlet is the best variety for general use; it has beautiful scarlet roots, 5 in. long, and from 2 in. to 2½ in. thick, tapering, and sharp-pointed. The flesh is highly flavoured and of the best quality. This excellent kind ought to be grown for the main crop in every garden, as it is very hardy and a large cropper. It is the best and the most useful kind for winter storing; it grows in almost every kind of soil, and, provided the plants are kept at a sufficient distance apart, it will resist drought better than any other garden kind, besides losing little or nothing of its valuable properties. Sow from March until June, in rows from 9 in. to 12 in. distant. Thin the plants as soon as possible, and keep them from 4 in. to 5 in. apart, according to the quality of the soil, as soon as they attain the size of a pencil. Hoeing and watering, in case of extreme dryness, will aid development and ensure a good crop of excellent Carrots. It is known under a great many names, according to the country in which it is grown; and, on account of its productive qualities, it has been cultivated sometimes in the field, where from 14 tons to 15 tons of roots have been produced to the acre.

The Intermediate Nantes Scarlet is of French introduction. Its roots are of a deep-red colour, 4½ in. long, 1½ in. to 2 in. thick, and bluntly cylindrical in form; the flesh is very superior in flavour and quality, the heart being far less developed and much more tender than in other varieties, and both for sauces and stews it is a most desirable kind. It is a most valuable acquisition to the kitchen garden, and it may be said that its value is thoroughly appreciated, for its cultivation has become very extensive for the short period during which it has been known. Although it is an earlier variety than the two preceding ones, it is not sufficiently so for forcing.

Sown from March to June, it will produce an excellent crop in the autumn, and throughout the winter. On account of the delicacy of this Carrot, considerable attention and care must be devoted to it during growth, which will be amply repaid by the results.

James's Intermediate is a favourite in English gardens. The root is 6 in. long, from 2 in. to 3 in. thick, and conical and sharp-pointed; the flesh scarlet, and of good quality. This hardy variety grows in almost any soil, and stands bad weather well. It keeps well, and is therefore suitable for winter use. It should be sown from March to May, in rows 12 in. distant, leaving the plants 4 in. or 5 in. apart. On account of its large producing capacity it is sometimes grown as a field crop.

The Altringham is an English variety, readily distinguished from any other. It is said to have originated, about sixty years ago, at Altringham, a village in the vicinity of Chester. Root slender, somewhat crippled, from 9 in. to 12 in. long, and from 1¼ in. to 1½ in. thick. In shape it is cylindrical at the upper part, tapering to a point at the lower end. In colour it is of a beautiful red, with a green conical top, showing about 1 in. above ground. The flesh is of the first quality, deeply coloured, and almost without any fibres. The heart is much reduced, comparatively speaking. This variety was much used for colouring butter before the discovery of annotta. On account of its good qualities it is generally used for cooking, for which purpose it is far preferable to the Surrey; but both these varieties should in all gardens make room for the more delicate-flavoured Intermediate kinds. Sowing should be made from March to the end of May, according to the climate and weather; heavy soils must be avoided as much as possible, the fragile character of the root rendering it difficult to pull. Twelve-inch drills and 4 in. to 5 in. between the plants are sufficient to obtain a fine crop.

Long Red is an old standard variety, the root of which tapers gradually, and is almost entirely buried in the ground. In colour it is a deep orange; from 9 in. to 10 in. in length, and from 1½ in. to 2 in. in diameter. The top is flat, and occasionally green; the flesh is yellowish inside, and the heart of a moderate size, but tolerably hard. It is the most succulent field variety, and is still used in English, Belgian, German, and American kitchens. The size and shape of the root are very variable, according to the soil and the climate, sometimes assuming a shorter and thicker form, which ought to be preferred. This variety may be occasionally seen among the Surrey Carrots in Covent Garden. It should be sown in deep soil, in 15-in. drills, the plants being thinned to 5 in. or 7 in. apart. On account of its colour it is often called the Long Orange Carrot, and also the Studley.

The Long Surrey is a variety grown in, and brought from, Surrey and other counties; the deep soil required for their full development rendering their cultivation about London unprofitable. The root is of a deep orange colour, from 16 in. to 20 in. long, and from 2 in. to 3 in. thick at the level of the ground. It is very slender, and the longest of all the Carrots, and grows entirely in the ground.

The only valuable quality of this variety is its capability of keeping in a perfect condition almost the whole year through, the woody, fibrous texture of its flesh resisting every injury. Even the heart, which is fully developed, does not become tender by boiling ; yet it is a favourite vegetable, and is daily used in English kitchens ; and the large quantities brought to Covent Garden during the winter attest that Carrots of a fine quality are little known in London.

The Red Pale Flanders is an old French variety, that used to be largely cultivated, but has now lost much of its celebrity, its cultivation being confined to some localities only. It is certainly the hardiest, and keeps the best of all the Carrots ; it is of a variable quality, has a pale-red root, that is conical shaped, slender at the lower extremity, and grows entirely in the ground. The heart is very large ; the top flat, and almost covered by the basement of the leaves, which are strong and vigorous. It will grow anywhere, even in the poorest soil, and will remain long fit for use after other sorts have disappeared. It is only fit for field culture, but in no case does it deserve very extensive cultivation.

Green-topped White Belgian is a standard variety of Belgian origin, well deserving its high reputation. The root is whitish, from 12 in. to 14 in. long, and from 2 in. to 3 in. thick, bluntly tapering ; a third part of the entire length grows above ground, is entirely green, and is rounded off towards the top. The leaves are dark green, large, and vigorous ; the flesh white, of good quality. It is seldom used in France either for soups or seasoning, as stated in some American reports ; but it appears to be appreciated in English cooking. This is a mammoth variety, and the largest cropper of all the Carrots, often producing 20 tons to 25 tons to the acre, besides being very hardy, and easily pulled. It is extensively used in field culture all over the Continent, no other root being of greater assistance to the farmer in keeping his live stock in condition through the winter. The Red Horn Carrots contain, it is true, a much larger proportion of nutritive matter than this kind, but they are so inferior in productive capacity that no advantage is gained by giving them the preference over the White Belgian for field cultivation. The time for sowing the latter varies, according to the soil and the state of the weather, from April to the beginning of June ; if later, the roots have not time to attain their full growth. In some countries the leaves are cut down two or three times to within 2 in. of the top for green food for cattle, but this practice is very injurious to the roots, and ought to take place only once, and then only a few days before pulling up the crop ; 15-in. drills, keeping the plants 5 in. or 6 in. apart, is generally sufficient room for this kind. The stock of this Carrot is generally bad, and its cultivation is not understood in England.

**Cultivation.**—Carrots require a deep, light, warm soil, well trenched, and previously well manured. Sowing must be effected in dry weather ; for, should a shower happen soon after the seed is *in the ground*, the crop will, in most cases, be a failure, if not sown *again immediately*. Drills ought to be preferred to broadcast sow ing, there being no possibility with the latter of attending to the crop conveniently. On account of its numerous bristles, Carrot seed is somewhat difficult to sow with regularity; therefore it is mixed with sand or dry soil. This difficulty is obviated now by buying clean seed from seedsmen—a practice adopted on the Continent long before it was in England. Laying the seed in wet sand or wet loam a few days before sowing, in order to stimulate germination, was once much practised; but, partly from the trouble, or partly from want of skill, this method is now seldom employed. It may, however, prove advantageous under some circumstances; for instance, in forcing and sowing in the open ground, where drought is to be apprehended. In the United States, it is the practice to soak the seed in tepid water for a day or two, and then to mix it with plaster or ashes. Carrot seed retains its vitality for four years; but if not threshed out, and stored in its umbels, it will last five, or even six, years.

**Forcing.**—The French Forcing and the Scarlet Horn Carrots are best for this purpose, but the former is to be preferred. Prepare mild hotbeds 2½ ft. high, in November or December, and 1½ ft. or 2 ft. in January or February; put on the frames, cover the bed with 5 in. or 6 in. of rich soil or mould, and, as soon as the whole is sufficiently heated, sow the seed broadcast, cover with ½ in. of mould, smooth the surface, and cover the glass with mats until the seed comes up. Should the interior get dry, give a slight watering, but be careful of damp. When the plants have four or five leaves thin them ½ in. apart; admit air as often as the temperature will allow of it, which will give strength to the seedlings. Take care the heat does not exceed 60° during the day and 50° at night, which may be easily regulated by tilting the glass. In the case of sharp frost, covering with mats is preferable to artificial heat. Shading, if needed, must not be omitted. Sowing in November, if carried on practically, will produce fine young Carrots at the end of February, which will last through March and April. Subsequent sowings—in December for March to April, in January for April to May, and, lastly, in February for April to June—must be attended to as required by market gardeners; but, in private gardens, the first bed should be made in November and the second in January; these will afford an ample supply until new open-ground Carrots are fit for use. Where frames are not available, prepare, at the beginning of February, in some warm corner, a bed of hot manure mixed with leaves, covered with 4 in. or 5 in. of mould; sow the seed and protect with mats supported with sticks or other apparatus. As soon as the seed comes up, remove the covering every day as frequently as the weather will permit, and the crop will be ready from the end of April to that of May. Parisian market gardeners mix seeds of Radish and Lettuce with those of Carrots, the former being ready for use before the Carrots, which are then left to produce a second crop—a reprehensible practice, as is that of planting Cauliflowers amongst forced Carrots.

For the first outdoor crop the seed should be sown in February.

on a warm, dry border, in 5-in. drills; cover the seed with ½ in. of decomposed mould; when the young plants have formed a few leaves, clear off the weeds, and thin them to 1 in. or 2 in. apart, hoeing and watering as required. The crop should be ready by the end of May, and will last until the general crop comes in. The best variety for this purpose is the Scarlet Horn. In June sow the same kind of Carrot again, if small roots be preferred.

Intermediate Scarlet and Intermediate Nantes are the best varieties for general crops. Sow from March to May (the latter month for winter Carrots), in well-prepared soil, in 9-in. to 12-in. drills, ½ in. deep. As the Carrots make their appearance, hoeing, weeding, watering, and thinning them to ½ in. apart, should be duly attended to. So soon as the plants attain the size of a lead pencil, thin them to 3 in. or 4 in. apart without hesitation. Thinning generally receives too little attention in every country; and the Carrots, crowded when young, are left to be taken up for use when they have attained sufficient size. In most cases the ground gets dry and hard, and thus prevents the lifting of the roots, which are then left until the autumn, when only small, useless Carrots are the result.

**Autumn Sowing.**—In August and September, select a warm border. Sow French Forcing or Scarlet Horn Carrot, as for the early crop. The roots must remain in the ground the whole winter; but, if well protected and the bed covered with 1 in. of mould, healthy little Carrots will be ready from February until May.

**Storing.**—In October, before the frosts occur, and on a fine day, take up the crop, cut the leaves ½ in. from the top, clear the roots from soil, and store them at once in a cold shed or cellar; there arrange them in tiers, spreading between each a layer of sand or dry soil, up to the height of 3 ft., the length being determined by the quantity of roots; two boards will secure the ends of the pile. By this means the roots can be easily and often examined, and those that are decayed removed. On the first symptoms of vegetation appearing, pull down the pile and build it again, and this method will enable the Carrots to be kept in a good state as late as possible. Another method.—In open ground, in a dry place, remove the soil to the depth of 1 ft., trench the bottom, adding some sand if possible; plant the roots vertically close to each other, and protect from frost and from wet. The objection to this plan is, that decay cannot be attentively watched, and vegetation is much more liable to be excited, to prevent which the roots must be lifted and again buried. Heaps should be avoided in the case of garden varieties.

**Disease and Insects.**—The Carrot is a prey to many enemies. Perhaps the worst to be feared is the Rust, and this occurs generally from the roots being grown in wet soil, or having suffered from dryness in summer. Too much fresh manure will also provoke it. There is no effective remedy for it, but salt and quicklime applied to the ground before sowing is an excellent preventive as well as a fertiliser. At spring time, in hotbeds or borders, the young plants of the first sowings are sometimes entirely destroyed by a small spider. Gardeners watching young Carrots are surprised the next day to see that every plant has disappeared. Soot spread over the drills, or the entire bed, will effectually prevent such a disaster. Snails and slugs are very fond of young Carrots, one of them being able to destroy a small bed in a single night. Quicklime spread over the young plants (which it does not injure), and around the beds, will secure the crop; for one application effectually destroys these marauders.—*D. Guiheneuf.*

No garden vegetable is more indispensable than the Carrot, for it is used daily in the kitchen for a variety of purposes that cooks only understand; and yet it is one of the most difficult to grow successfully, as most cultivators know, and simply because of the numerous enemies which prey upon it from the time the seeds germinate till the crop is housed. The Carrot-louse attacks the young plants almost as soon as they appear, often doing much damage, like the Turnip-fly, if growth be retarded at the beginning. Then the Carrot-grub is even more destructive, boring into the roots, and often ruining a whole crop in spite of all precautions. In addition to these pests, the wireworm, millepeds, and several other enemies sometimes do much mischief, carrying on their destructive operations, even to the devouring of the seeds when they come to maturity. Could we steer clear of the various enemies to which it is subject, the Carrot is not fastidious as to soil, for it will thrive amazingly in peat, in a sandy soil, and in a middling heavy loam; but a stiff adhesive soil is the worst of all for it, or indeed any soil which obstructs the downward progress of its tapering roots. Though, like the Turnip, it prefers a good rich soil, it should never be sown on newly-manured ground, otherwise forked roots are sure to be the result. Ground that has been well manured the previous year for some other crop, such as Celery, Potatoes, Onions, or Peas, etc., will suit Carrots admirably; but avoid such crops as Cabbage and Turnips, or any of the tap-rooted section. The soil cannot be too well trenched and broken up before sowing; it should at least be double dug, as the roots of even the Short Horn varieties of the Carrot penetrate the soil to an incredible depth, if they can get down. It is not the usable part only of the vegetables which represents the root, but the long tap feeder, which goes straight down into the moist soil beneath and pumps up the principal supply of moisture, and not unfrequently saves the crop in a dry season. Deep tillage will, for these reasons, therefore, always pay for a Carrot crop.

**Carrots for Exhibition.**—When Carrots are required for exhibition any other time than in the winter, the short kinds are the best for the purpose. French Forcing Carrots may be got in good condition by May and June, as may also the Scarlet Horn; but if for show in July and August, there is no kind better than the Early Nantes, where a little protection, such as spare sashes, or even hand-lights, can be afforded the plants when in their young state.

In order to have the roots straight and shapely, it is a good plan to have a tin tube, in size proportionate to the variety that is grown. It should be made wide at the top and tapering towards the point, with a strong handle on each side. For the short varieties a tube 1 ft. long and 3 in. in diameter at the top and 1½ in. at the bottom will be large enough. Holes should be made with this 10 in. or 12 in. apart, and afterwards filled up with rich sandy loam finely sifted. In each of these places should be sown ten or a dozen seeds, burying them ½ in. in the soil. If dry, the ground should then be well watered, and flower-pots inverted over the seeds until the plants are up, when they should be gradually inured to the light by tilting the pots for a few days previous to their being entirely removed. The plants should be thinned out as they advance in growth, until only three remain in each spot; these should be allowed to remain until the strongest and healthiest are developed, and the others finally removed. A sloping sunny border is the best place to grow Carrots for this purpose, and, in the event of dry weather setting in, copious waterings will be necessary; therefore, ridges of earth should be placed between the rows to prevent the water from running down the slope. When lifted for exhibition care must be taken to have all the roots entire. The Carrots should then be laid in a tub of water to soak for a few minutes, in order that the dirt may be more easily removed without injuring the skin, which operation should be performed with a soft brush or sponge. The straightest and most symmetrically formed ones should be selected, and match each other as near as possible. The tops may be cut off within 4 in. or 5 in. of the crown; the roots wrapped in paper to keep the air from them until they are placed on the exhibition table.

## Celery

(*Apium graveolens*).

Celery is found in its wild state in ditches and marshy places on the British coast. The cultivated form is, however, very different to that of its wild state; and when well grown this salad is unsurpassed for crispness and excellency, and is in large demand in every English family. But to grow Celery thoroughly well entails more than an ordinary amount of labour and expense; hence we seldom find it much cultivated excepting by those who have these means at command, or in localities where the soil is specially adapted to its culture; Nottingham, for example, is a great locality for Celery culture, and to some of the local exhibitions held there enormous heads are often brought. In the year 1869 an exhibition of vegetables was held at Chalton, a small town near Nottingham, at which there were twenty-eight exhibitors, the prize winners showing heads of wonderful size and solidity. The weights of the six heaviest sticks were as follows:—7 lb. 14 oz., 7 lb. 10 oz., 7 lb. 2 oz., 7 lb., 6 lb. 10 oz., and 5 lb. 11 oz. It will thus be seen that even cottagers and amateurs, with their simple means, often obtain better results as regards size than even our foremost gardeners. Quality is, however, the main point to be considered, and this quality can only be obtained by strict attention to the crop from the time of sowing to that of reaping. There are two distinct varieties of Celery—the Red and the White; the former is the hardiest, and the kind generally grown for winter supply, the White being, however, the most useful for early work.

**Sowing.**—Sowings for the supply of Celery during July and August should be made in heat early in January, the White kinds being the best for this purpose. This seed should be sown thinly in pans or shallow boxes, well drained, and filled with light, rich soil, covering the seed very slightly with finely-sifted mould or sand. A gentle watering should then be given, and the pans or boxes plunged in a gentle bottom-heat, if possible, or they may be placed on a shelf in any warm house. It is a good plan to place a piece of glass over the pans, and on the glass lay some damp Moss. The plants will be up in a few days, when the Moss must be removed, and, in a day or two afterwards, the glass be taken off and the plants freely exposed to the light, to prevent them from becoming drawn. When the plants have made a pair of leaves above their seed leaves they should be taken into a somewhat cooler temperature, where after a week or two they will be ready to prick off into other boxes or pans 2 in. or 3 in. apart. They should then be placed as near the glass as possible in an early Vinery or Cucumber pit, or some other such place, giving them all the air possible. The soil must be kept clear of weeds, and be constantly stirred with a small stick among the plants; and if a little soot be occasionally sprinkled amongst them and well watered in, the beneficial effects will soon be seen. As the weather becomes milder, the plants may be taken out and placed in cold pits or frames, and kept rather closer than when they were in heat. By the beginning of April there will generally be frames at liberty that have been recently occupied by Early Asparagus, etc.; if not, a temporary frame must be made and placed on a slight hotbed, composed from old linings, etc. Into the bottom of the frame must be put 4 in. or 5 in. of good rotten manure, and on the top of the manure about 6 in. of good loam and manure in equal quantities mixed together. The plants should then be taken out of the boxes with as much ball as possible, and planted in the newly-prepared bed 9 in. apart; give a good watering, keep close for a few days, cover during cold nights, and sprinkle overhead on sunny afternoons at the time the lights are closed. When planted, the tops of the plants should not be more than 6 in. from the glass, and as they advance in growth, copious waterings must be given them at the roots, and the frame raised a little at a time until the weather is warm enough to admit of its being taken off entirely. When this is the case a good earthing should be given, and another in a fortnight or so afterwards. Fair Celery may be obtained in this way by the middle of July. The first sowing to obtain plants for the open trenches should be made in heat in March, and treated in the same manner as just mentioned, and transferred to the trenches early in June. If may be planted in double rows 9 in. apart and 6 in. between the rows. The trenches for this batch need not be more than 2½ ft. from centre to centre. This will come into use in August and September. The second sowing should be made in a cold frame in April, or under hand-lights on a warm border under a wall. When large enough, the plants may be pricked out in an open border prepared in the following manner :—Rake the ground level, and well tread it to make a hard bottom; on this place 2 in. or 3 in. of rotten manure. Tread this well down, and sprinkle a little soot over it to keep down the worms; 4 in. of good loam should then be placed over this and firmly trodden, the surface raked level, and the plants pricked into it 6 in. apart each way. The principal sowing for late autumn and winter supply should be made early in May on an open border, kept well watered, and otherwise treated as the previous sowings, and transferred to the trenches in the middle or end of July. The red kinds of Celery are best adapted for this crop. Late Celery requires to be kept growing from the commencement with as little check as possible; and better results will be obtained from plants sown late and kept growing than from those that have been sown early and kept in a stunted condition. Very early Celery is better for being transplanted several times previous to planting out; otherwise it is liable to run to seed. To save seed, the best plants should be selected in the autumn and marked, and in spring lifted and placed in a rich, warm border, and supported with stakes. Plants for this purpose should not be earthed up.

**Planting.**—If Celery plants have been pricked out on a bed with a hard bottom as recommended, they will be found to come up with a good ball and the roots intact—*i.e.*, if care be taken in lifting them. The best plan is, two or three days previous to planting, to run a sharp knife or spade down the centre of each row, and do the same crosswise, following this with a good watering, which will settle the soil and prevent any sudden check to the plants. In a day or two a spade may be run under the plants, which may be lifted, placed upon a hand-barrow, and carried to the trenches, where they may be planted from 9 in. to 12 in. apart, according to the variety grown and the space at command. There is difference of opinion as to whether it is best to plant in single or double rows. Where large Celery is required, the former is doubtless the plan to be preferred, but good Celery may be grown by planting double rows 8 in. apart; in this case, however, wider trenches will be necessary. When double rows are planted it is not advisable to plant in angles, as is often done, but plant two abreast, each pair being not less than 10 in. or 12 in. apart, unless it is a very dwarf variety that is grown. By planting in pairs the operation of earthing is much more easily accomplished than when in angles, and the roots can be dug up with greater facility. Dull, showery weather is the best time for planting Celery, during which operation the plants should be pressed in firmly, the roots covered 2 in. or 3 in. with soil, a good watering given to settle the soil, and if 1 in. of half-decayed leaves be afterwards spread over the surface, they will prevent evaporation and encourage the surface roots.

**Preparing the Ground, Trenches, etc.**—Ground that is intended to be planted with Celery in the spring should, if possible, be trenched in the autumn to a depth of 2 ft., or deeper if the soil will allow. If the soil be not already rich, a good dressing of rotten manure should be well incorporated with it during the process. The surface should be left in a very rough state, in order to expose as much of the soil as possible to the pulverising influences of the weather. The trenches may be dug any time during the winter, and the vacant spaces planted in the spring with early Cauliflower, Lettuce, Endive, or any other crop that will be off the ground before the Celery will require earthing up. It is a very common practice to dig Celery trenches too deep; this should, however, be guarded against, especially for late crops, and when the soil is of a wet nature, for if the water cannot readily drain away from the hearts of the plants during wet weather the Celery will rot, and disappointment be the result. Trenches 6 in. deep after the manure is added will be deep enough, and this will admit of the trenches made by earthing between the rows being lower than the roots of the Celery, by which means good drainage is secured. The width of the trenches and distance apart must be determined by the variety grown, and whether they are to contain single or double rows. For single rows 18 in. will do, if wider cannot be afforded; and for double rows 2 ft. apart must be allowed. As Celery is a surface-rooting plant, it is necessary to allow as wide a trench as possible, inasmuch as in narrow trenches the principal feeding roots of the plants soon come in contact with the sides, and thus to a great extent escape the benefit of the manured soil especially intended for them. Good Celery may be grown in trenches 4 ft. apart from centre to centre, but if 5 ft. or 6 ft. can be allowed, all the better. Where ground is limited, the dwarf-growing kinds of Celery are the best to grow.

**Manure.**—The best kind of manure for Celery is that obtained from the horse and the cow, and when mixed together these form excellent material. Mr. Pragnell, of Sherborne Castle, well known as an excellent grower of the Celery, prepares manure for it in the following manner:—In the autumn large quantities of horse-droppings are collected, and receive a liberal admixture of soot, salt, and lime; the whole is turned over several times to well mix it, and is then allowed to remain for use in the spring. Worms being one of the chief enemies of the Celery, manure containing them should be avoided as much as possible; thus, if liberal dressings of soot, salt, and lime be mixed with the manure as mentioned, these enemies will be quickly dispelled. Rank manures and strong manure-water should be avoided, as they have a tendency to cause the Celery to become spongy and ill-flavoured. Although soil of a rich sandy nature is best suited to Celery, yet fair heads may be grown in almost any well-drained soil, provided it is well enriched with manure; indeed, good results are sometimes obtained from peat soil.

**Earthing.**—This operation should be performed only on dry days, taking care that none but well-pulverised dry soil is permitted to come into immediate contact with the plants. The soil should be chopped down on each side of the trench, and turned over to dry early in the morning, well breaking the lumps as the work proceeds. When the plants are dry—which they will be towards the middle of the day—the operation may be commenced by carefully removing any decayed leaves from their bases; then gather the leaves neatly up together with the left hand, and firmly place the soil round the plants with the right. When all the plants have been served thus, the sides of the trench should be evenly chopped down, and the surface left neat and tidy. Many people tie up the plants with matting previous to earthing, and some use Celery collars; but neither of these plans are necessary, and only involve needless trouble and labour, and earthing can be performed by any intelligent man without resorting to such troublesome means. It is certainly not necessary to earth up Celery when it is growing rapidly, and moreover it is bad practice. A little earth, pushed down after a heavy watering to prevent evaporation, is all we should give during the growing season, and we know it to be a fact that some of those who grow the finest Celery in the country do not earth until full growth is attained; indeed, some of them do not earth at all, but effect the blanching by other means. As before stated, that some old professionals of fifty years' experience, and many other persons, pursue quite a different course, we are well aware, yet one would think that a single hint would suffice to point out that it is difficult to give abundant waterings to Celery, and impossible for it to benefit by the natural rains, if we pile a sharply-sloping bank of firm earth close along each line long before the plants have attained maturity or vigour. And no plant is more benefited by profuse waterings than this, naturally an inhabitant of swampy places. The repeated earthings which Celery receives in the majority of gardens are not only harmful to the crop, but the cause of a great waste of time and labour. Common errors are frequently made in Celery culture,—one being that in earthing up the plants too much soil is applied at one time, by which the hearts are covered in, and are thus made to bulge out on one side and become deformed; whereas, when the operation is more lightly done, as well as oftener, the heads are kept upright and the growth is much more vigorous. Another error, which is perhaps the worst, is "earthing" or banking up the crops too heavily in autumn, or before winter sets in. This is a very common practice, especially among amateurs, who often cover their Celery over head and ears. This is sometimes done with a view to keep out the wet and frost from the crops, but in such cases the plants fail to grow from want of air; in fact, as already indicated, the plants are buried, and consequently soon become rotten; and, though the wet weather may be blamed for this, it may even happen when the ridges are covered with litter or boards. It is therefore obvious that earthing should be done more sparingly, taking care that the growing hearts of the plants are well above the ridges, especially in the case of late crops. If this be done, there will seldom be any reason to complain of crops rotting, however damp and severe the winter may be. Those who protect the ridges to fence off the weather appear to overlook the fact that the means employed for this purpose prevent the escape of moisture by evaporation from the earth, in consequence of which the plants are more apt to rot than if their tops had been freely exposed to the air.

**Culture in Market Gardens.**—In market gardens Celery is grown in bulk much better than we generally find it in private gardens. The crop is large, crisp, and solid, and neither care nor labour is spared to bring it to perfection; indeed, this is the only outdoor crop in market gardens that is persistently watered. The Red and White Solid are the only two kinds cultivated. The seed for the first crop is generally sown in February broadcast, on a slight hotbed, and thinned out after the plants are up. A large or main sowing is made in March, and another for a late crop in April. All sowings are usually made in frames in gentle hotbeds, but Mr. Geo. Steele, of Fulham, sows his main crop on an open-air bed in the last week of February; a trench some 15 in. or 18 in. deep, 6 ft. wide, and any length (say 20 yds.), is cast out and filled firmly with fermenting manure, over which a thin layer of common soil is placed. This being levelled and well rolled, the seeds are sown broadcast over the whole surface, and slightly covered by sifting some light soil over them. The bed is then covered with rank litter until the seeds germinate, when the litter is removed during fine days, but replaced at night until the weather is sufficiently genial for the plants to stand without any covering whatever. The seedlings, both in frames and in beds, are freely exposed day and night in favourable weather, and in the case of frames the sashes are lifted until the weather permits of their entire removal. When the seedlings in either case become thick they are thinned a little, and when they have attained a fair size they are pricked out (in May) into sheltered beds in the open air, 2 in. or 3 in. apart, and 9 in. between the rows. Plants from early sowings are pricked out into frames. Here they are allowed to remain until time and convenience permit them to be permanently planted out. A great point observed by all growers is to have the ground intended to be planted with Celery prepared as soon as possible in autumn or early winter by heavily manuring the rows, and trenching and ridging it, permitting it to remain in this condition until it is required for Radishes or spring Cauliflowers. Generally the Celery is planted in the alleys between the beds of Radishes, thus leaving the rows 5 ft. apart, or between alternate lines of Cauliflowers in May and June, in which case the Celery will have taken to the soil and begun to grow before the Cauliflowers are all removed. When this sort of interplanting is practised, provision is made at manuring time by marking off the ground in 5-ft. breadths, and giving a quadruple quantity of manure under each line; and into this the Celery is eventually planted, thus saving the labour of re-manuring, which would cause a disturbance of the spring crop. If the Celery, however, be planted in an open field after the entire removal of a spring crop of vegetables, the ground is cleared of all refuse, dug over, and marked off; and if it have not been previously prepared by giving the extra quantity of manure in winter, that must now be applied. For the first crop and the main crop the rows are usually 5 ft. apart; for the late main crop, 4½ ft.; and for the latest or winter crop, 4 ft. apart. No ridges are formed, as is the case with private gardens, a furrow being merely drawn with a hoe, as for sowing Beans or Peas, but a little deeper and wider; and into these furrows the plants are inserted by means of a dibble. When a clean field is lined off and ready for planting out with Celery, it is precisely like a field of seed-beds, with the beds all 4 ft. wide, and the alleys 1 ft. wide and about 4 in. or 6 in. deep. Market gardeners never plant more than one row of Celery in each line, and the plants are about 8 in. or 9 in. asunder; the strongest are planted out first, and the remainder form successions. Experience has taught growers for market that deep planting is not advisable, more especially in the case of late crops, from which dampness at the root must be avoided; they therefore plant in such a way that, when finally earthed up, the roots shall be above the level of the trenches. The space between the rows is planted with Lettuces, French Beans, Cauliflowers, Coleworts, or Endive. Earthing up is generally performed at three different times. In the first operation, which is done when the plants have made large leaves and gained good strength, the soil is placed about the plants from the intervening space, taking care not to injure the roots of those growing on it. At the two first earthings a hollow is left along by the necks of the plants, so as to conveniently retain a good supply of water. At the third and final earthing, the ridges are well closed at the top by pressing in the soil against the plants by means of wooden rakes; a man going on either side of the ridge, and both, pressing with the back of the rake at the same time, fill up the furrow effectually. Celery is most liberally watered during the growing season, either in the ordinary way, or by means of hydrants, to which 1-in. metal pipes are attached, or common gutta-percha hoses; hogsheads placed at intervals in the fields supply water for the purpose. The best method of distributing the water is by the hose, which should be used in the following manner:—One man carries the end of the hose along the ridges, directing the stream of water, whilst another keeps the hose free from twisting; and if the length be great a third must be employed to help, and to attend to the turning off and on of the water. Towards the end of August the early produce comes into use, and from that time until February a regular supply is kept up. Before lifting the crop, part of the leaves are switched off with a sickle; then, in lifting, a trench is thrown out at the end of a ridge, which is partially levelled, and the crop is removed at the same time; a set of people being employed in lifting, another in wheeling or carting to the packing shed, and a third in washing, bunching, and packing. Sometimes a crop of Celery is grown expressly for use in soups. For this purpose the seeds are sown in June, pricked out as usual, and finally transplanted into rows 2 ft. apart. As they never grow much, this distance is sufficient for them, for they are seldom earthed up more than once, and if kept until the warm weather sets in, they will certainly "bolt," and become useless.

**Celery for Exhibition.**—In growing Celery for this purpose, it must be observed that the point of quality prevails over all others; next to this, of course, comes size, but large coarse heads are of no use for exhibition, and it is unadvisable to try to grow them too large, as is often the case, and this at the expense of quality. Celery is sometimes shown in its perfect form, and at other times is trimmed. In the latter case it should by no means be dressed until just before it is put on to the exhibition table, which will then give it a fresh appearance. The best blanched and most perfect heads should always be selected, and they should be as nearly even as possible. We have seen Celery for this purpose beautifully blanched by enclosing the plants in two half-drainpipes placed in an upright position, the cavities being filled with dry sand. Where, however, large quantities are required, this becomes troublesome and expensive. In digging Celery, care should be taken to have always a good open trench in front of the plants, so that the spade or fork can be got well under the roots, and the whole raised up without damaging the hearts. Large quantities are spoilt in many places by being dug by persons who do not pay attention to this matter.

**Insects.**—Celery is liable to several kinds of insect enemies—one especially, generally termed the Celery fly (*Tephritis onopordinis*), which lays its eggs on the foliage of the plants, which are eventually transformed into a dark-brown maggot, encased in thin wafer-like capsules. The only remedy is to pick off the infested leaves and burn them. Celery is also liable to canker when grown in wet or wormy soils. Slugs, especially in moist weather, are very destructive to Celery crops; but their progress may be arrested by dredging along the tops of the ridges with air-slaked lime, or soot, and operating similarly on the banks or hedgerows surrounding the field where it grows. Highly cultivated ground, if inland, is seldom infested by this pest; but where there are neighbouring hedges or banks, these slugs are sure to be found; and no matter how well tilled the soil may be, their ravages will become apparent unless preventive measures are resorted to.

**Varieties.**—There are many varieties of Celery, known under several names, all of which are said to be distinct kinds, whereas in reality there does not exist more than one-fourth of the number advertised in nurserymen's catalogues. An admirable opportunity for observing this was afforded a few years ago at South Kensington, where prizes for the best three sticks of any White, and the same number of any Red kind, were offered, and which brought together thirty lots of considerable variety. From the Society's gardens forty-five so-called kinds were exhibited, but the differences between many of them were indeed minute. Celeries differ materially in colour, in habit of growth, and in solidity—both of leaf-stalk and of the entire plant—in flavour and crispness of eating, and in good keeping qualities. As a rule, Red Celeries are thought to possess these latter qualities to a larger extent than White sorts, but this is not the case with all Red kinds. White Celeries are, however, considered to be the earliest, and are therefore invariably grown for the first crop. Some kinds are undoubtedly earlier than others, but much more depends on the period at which the seed is sown and the after culture than on the early qualities of any particular variety. Probably there is no vegetable of which fewer sorts are grown in any one garden than Celery—one good White and one good Red kind generally being enough; but it is a matter of no little moment to be certain that these sorts are really good, solid, crisp, and well-flavoured. Celeries that have a straggling habit of growth seldom turn out so well as upright, close-growing kinds. Moreover, the latter are easier to handle in earthing up, and it is only those who perform this operation who can fully understand the difference between the two habits of growth, as upon the manner of earthing up depends much of the subsequent value of the crop. Among Red kinds, none equal, for colour and compactness of growth, the Leicester Red. Very fine and firm are the Sulham Prize Pink and Carter's Incomparable Crimson, both distinct kinds, tall in growth, and robust in habit. Another good-looking sort is the Manchester Red, of which there are several synonyms. Among Whites, the best and only true dwarf kind is the Incomparable White, commonly known also as the Sandringham White; this is compact, firm, and crisp. Next in height and quality may be reckoned Veitch's Silver White, a good, firm variety; the best of the tall kinds being Wright's White Grove and Seymour's Solid White.

Forty-seven reputed varieties were tried at Chiswick in 1874, and of these twenty-three were Red and twenty-four White. These, by the detection of numerous synonyms, were reduced by the committee to twenty—viz., seven red varieties and thirteen white, which it was decided were distinct. The seed was sown early in March in heat, and the plants pricked off and planted out early in June in single trenches, and treated after the ordinary manner. The plants were frequently examined by the Committee whilst growing, and again when fully grown, and a portion of each sort was left to test their capabilities of standing the winter. The season of 1874 was particularly favourable for the growth of Celeries, so that the trial was in every way satisfactory. The following were the principal varieties and their synonyms:—

**Red Varieties.**—Manchester Red (syns., Sulham Prize Pink, True Manchester, and Giant Red).—Plant of strong and vigorous growth; height 3 ft. 4 in.; heads compact, average girth 12 in.; heart very solid; stalks broad, thick, and fleshy; a very excellent sort, and stands the winter well. This is the largest variety. Ivery's Nonsuch (syns., Osborn's Select Red, London Market Red).—Plant of strong and vigorous growth; height 3 ft.; heads compact, average girth 12 in.; hearts very solid; stalks very solid, broad, thick and crisp, and of a fine nutty flavour. One of the best. Kimberley's Red (syns., Improved Solid Red, Stuart's Solid Red).—Plant of regular, but somewhat spreading, habit of growth; height 2 ft. 6 in.; hearts very solid; stalks broad, thick and crisp, of fine flavour. Carter's Incomparable Crimson (syn., Carter's Incomparable Dwarf Crimson).—Plant of close, compact growth; height 2 ft. 6 in.; heads very compact, deep rosy pink; hearts very solid; stalks thick and fleshy, and of fine quality. This is the dwarfest Red Celery, and a good hardy variety to stand the winter. Webster's No. 1 (syn., Webster's No. 4).—Plant of somewhat slender growth; height 2 ft. 10 in.; heads compact, average girth 10½ in.; heart solid; stalks solid, thick, very crisp, and of good quality. Leicester Red (syn., Major Clarke's Solid Red).—Plant of erect, compact growth; height 3 ft.; heads very round and compact; average girth 12 in.; hearts very solid, blanching well for about 12 in.; the inner stalks broad and thick, very crisp, and of a fine nutty flavour. One peculiarity of this Celery is that of the core rising about 2 in. in the heart, as if it were to run to seed. This core portion is by many considered the best part. This variety, from its close, compact growth, blanches easily, and is the best Celery for autumn or early winter use, but it does not stand the winter so well. Wright's Improved Grove Red.—Plant of the same appearance as Leicester Red, but somewhat dwarfer; the heads are also larger, being 18 in. in circumference; hearts large, very solid, and good. This is an excellent sort.

**White Varieties.**—Grove White.—Plant of strong and robust growth; height 2 ft. 9 in. This is an exact counterpart of the Grove Red, but white, and possessed of the same excellent qualities. Does not stand the winter so well as other sorts. Incomparable Dwarf White (syns., Sandringham, Dean's Compact White).—Plant of very dwarf and compact growth; height 24 in.; very compact; average girth about 10 in.; hearts solid, and of a pure white; the stalks broad, thick, fleshy, crisp, and of fine quality. This is one of the best sorts: its close dwarf growth renders it easy to blanch with remarkably little earthing-up. It is good for early use, and also stands the winter well. Seymour's White (syns., Goodwin's White, Northumberland Champion White).—Plant of spreading habit; height 3 ft.; heads large, hearts solid, stalks broad, thick, and fleshy. This is the largest-growing white Celery, and apt to become pithy if very strongly grown. Prizetaker White (syn., Veitch's Silver White).—Plant of slender growth; height 3 ft.; heads large, stalks narrow, hearts rather soft, but of fine flavour. Dixon's Mammoth White.—Plant of close, compact, robust growth; height 2 ft. 3 in.; large girth (14 in.); hearts very large, blanching about 11 in., somewhat soft, but excellent. It stands the winter well. Haywood's White Queen (syns., Stuart's Giant White, Goodall's Flat-stalked, Webster's White).—Plant of robust growth; height 2 ft. 9 in.; heads large, hearts solid, blanching about 14 in.; the stalks very large, broad, thick, and fleshy, but without much flavour. An excellent sort to stand the winter.

**Veitch's Solid White.**—Plant of close compact growth; height 2 ft. 6 in.; girth 11 in.; hearts very firm and solid, blanching from about 12 in.; the stalks broad, thick, crisp, and tender. A very excellent variety, and stands the winter well. **Boston Market.**—Plant dwarf, from 18 in. to 20 in. high; leaflets small, pointed, and sharply serrated. This variety is not used to produce a single head, as the ordinary Celeries, but has the peculiarity of forming a number of side shoots or small heads which are blanched. It is only suitable for early work, as it begins to run to seed almost as soon as planted out. **Frise, Curled or Garnishing.**—Plant of loose growth; height about 2 ft.; leaves very pale green, and deeply cut or curled, almost like Parsley. It is very ornamental. The leaves may be used for garnishing, but it is of no other use. It is very tender, and runs early to seed.

**Celeriac.**—This is a kind of Turnip-rooted Celery, the root of which is principally used in soups, but it is sometimes boiled and eaten as a common salad. It is little grown in England, but the Germans grow it largely and are very fond of it. The seed should be sown in April under a hand-light, or on a warm border pricked out in the same way as Celery plants, and finally planted in rows on an open border 12 in. or 15 in. apart each way. Trenches are not required for Celeriac, neither should the plants be buried deeply in the soil, but the root allowed to swell above the surface, after the same manner as the Turnip. When the plants have attained their full growth, it is well to cover up the bulbs with soil, in order to render them whiter and more delicate than they otherwise would be. It thrives best in a rather light, but rich sandy soil.

## Chick-pea

(*Cicer arietinum*).

THIS is principally grown for its seeds, which are used in soups. It is very little cultivated in England, but the French grow it largely and use it extensively for the above purpose. There are several varieties of it, which are distinguished by the colour of their seeds, which are yellow, white, and red. The Chick-pea requires similar treatment to that of the garden Pea, but the pods should be allowed to get nearly ripe before they are picked. If allowed to get quite ripe, the pods burst and the seeds are lost.

## Cucumber

(*Cucumis sativus*).

THE CUCUMBER is a native of different parts of India, South America, and other hot countries, and is now grown extensively in almost all parts of the world, and in warm countries brought to great perfection without the aid of artificial heat. In Britain, however, the case is different; and in order to secure a good supply of perfect Cucumbers, even during the warmest seasons of the year, artificial heat is indispensable. Cucumbers are grown in a variety of ways—as in houses, pits, frames, etc., and occasionally out of doors; the latter plan is not, however, so much practised as formerly, owing probably to the unpropitious seasons we have experienced of late years. For salads the Cucumber has few equals, and it is now used in various ways in cookery. The best mode of culture is that of growing it in houses, which, if properly constructed, will yield a supply at all seasons of the year. Propagation is effected by seeds and cuttings. The best kind of house is undoubtedly that with a span-roof, a pathway running through the centre, and a bed on each side. The size of the house must of course depend upon the demand. Small houses are, however, best for Cucumber growing; and if two can be used for them and Melons alternately, it will be found much more convenient than having one large house. A house entirely devoted to Cucumber-growing all the year round must necessarily be larger than when it is only used for winter or spring crops—inasmuch as, having to keep up a continuous succession, fresh plantations must be constantly made; therefore the best kind of house is that with a bed on each side, as before mentioned, planting the beds alternately as each set of plants becomes exhausted. A span-roofed house, from 15 ft. to 20 ft. long and 10 ft. or 12 ft. wide, will, if properly managed, afford a sufficient supply for most private establishments, unless they are very extensive. Houses with comparatively low-pitched roofs generally yield the best results, with least trouble from scorching, red spider, etc. They should be built high enough to allow of plenty of head-room, but not higher than is really necessary, as low, close houses are most suitable for Cucumber-growing. Heat produced by hot-water pipes is decidedly the best for supplying atmospheric warmth, inasmuch as it is of a more humid nature than that produced by flues, etc. There should always be sufficient piping distributed over the house to keep up the required temperature without being obliged to make the pipes intensely hot—the latter being productive of many evil results, such as scalding, red spider, etc. Evaporating pans, placed over the pipes, are of great assistance in keeping the atmosphere of the house in a moist state. Cucumbers may be successfully grown in low lean-to houses, with no other glass than that of the roof—the heat being supplied by means of a brick flue running round the house, and a stage consisting of rough wooden slabs or planks, supported upon brick piers or wooden posts, erected over the flue along the front of the house. The stage should be 3½ ft. from the glass, which will allow for 18 in. of soil, and 12 in. for the plants to grow before reaching the trellis, supposing the trellis to be 12 in. from the glass. If the front of the stage be boarded up, a good bottom-heat may be secured.

Bottom-heat is considered by many to be indispensable in Cucumber-growing; this, however, has been proved to be a mistake, and we have often seen the best Cucumbers grown without it. That plants are benefited to a great extent by the use of bottom-heat judiciously applied, we do not for a moment dispute; but still it is not absolutely necessary, except in the case of early Cucumbers grown in pits and frames. Where, however, it is applied, it must be done with judgment, for there are often crops of Cucumbers ruined by an excessive bottom-heat. Stable manure is frequently used to supply bottom-heat to Cucumbers; and where it can be properly regulated it is the best, inasmuch as the ammonia from the fermenting manure is most beneficial to the plants, and as the heat gradually declines the roots descend into the decaying manure and draw therefrom a vast amount of nourishment to support the heavy crops of fruit they constantly carry. A considerable amount of labour in root-watering is also saved. In private gardens hot water is much cleaner and perhaps gives less trouble, and where the pipes are laid in a tank, and the tank at intervals supplied with liquid manure, good results can be obtained.

**Winter and Spring Cucumbers.**—For this crop many cultivators obtain plants by means of cuttings, with the view of getting fruit quicker than from those raised from seed. There can be no doubt that if cuttings be put in at the same time as seeds, the former will make plants capable of bearing fruit earlier than the latter; but they will not continue in a bearing condition so long, nor produce such good fruit as healthy seedling plants. Where any particular kind is grown, and it is desirable to keep it true, propagation by cuttings is the only sure way of attaining that object; but as a rule seedling plants are the best. Where, however, cuttings are preferred, they should be put in about ten or twelve days before they are required to be planted out. The best way is to stop the plants from which the cuttings are to be taken a week or two previously; they will then send out side-shoots, which should be taken off with a joint of the older wood attached to them, and inserted singly in small pots well drained and filled with a compost of leaf-mould, loam, and sand, in equal parts. If inserted close to the side of the pot they will strike sooner than if placed in the centre. The pots should then be plunged in a bottom-heat of 70°, have a hand-light or bell-glass placed over them, and be shaded from the sun; and if kept well watered and sprinkled overhead they will be sufficiently rooted in a few days to allow of the hand-lights being taken off; thus the plants will be gradually inured to the light and sun, which treatment will effectually prevent them from becoming drawn. If the plants be likely to become pot-bound before the bed is ready to receive them, they should be shifted into larger pots, otherwise they will be materially injured. In order to obtain a good supply of Cucumbers during the winter and spring, it is necessary to sow sufficiently early to allow of the plants becoming strong and in a fruit-bearing condition before the short dark days arrive; strong plants should therefore be in readiness for putting out not later than the end of September. If plants be obtained from cuttings, they will require to be put in the second or third week in that month; if from seed, a week or ten days earlier. Many cultivators soak their Cucumber seeds in water for a few hours previously to sowing; and in the case of old or very dry seeds it is an excellent plan, inasmuch as it softens the seeds and causes them to germinate quicker than they otherwise would. There are various methods of sowing: some growers sow single seeds in small pots, and thence turn them out into the beds; others sow a quantity of seed thickly in pans or large pots, and transplant them. We have found it a very excellent plan to put two or three seeds into 48-sized pots half filled with light leaf-mould and sand, just covering the seeds, and when they are up select the strongest of the plants to remain, and pinch the others out. By the time the remaining plants have made a pair of rough leaves, roots will frequently be seen pushing from the bases of the stems. The pots should then be filled up with soil to within half an inch of the rim, into which their roots will quickly penetrate, and thereby strengthen the plants, and afford them more room to grow without disturbing the roots, as would be the case in re-potting or transplanting. In whatever way they may be sown, they should, if possible, be placed in a gentle bottom-heat, and kept moderately moist until they are up, when they must be placed near the glass, or where they can obtain plenty of light and sun, in order to keep them dwarf and stocky. Whilst the plants are becoming established the bed should be prepared for planting, bottom-heat being provided by means of hot-water pipes or fermenting material. A layer of good thick turves should be laid on the bottom of the bed, grassy side downwards; upon this lay the soil in a ridge along the centre of the bed, and when it is sufficiently warm the plants may be turned out into it 2 ft. apart, planting them 1 in. or 2 in. deeper than they were in the pots, and afterwards watering them copiously with tepid water. A good brisk heat should be kept up until the plants get well established in the beds—say 65° by night and 70° by day, allowing the glass to rise 10° higher by sun-heat, with a bottom-heat of 65° to 70°. After the plants begin to root freely into the soil in the bed, air should be admitted in the morning on every favourable opportunity, closing early in the afternoon in order to secure all the sun-heat possible. No more fire-heat than is absolutely necessary to keep up the required temperature should be used, inasmuch as all plants thrive much better under the influence of solar heat than by any artificial means. The subsequent treatment consists of training the leaders of the plants up the wires and stopping them when they reach the top. This will cause them to send out side-shoots all the way up the stem, which shoots should also be stopped at the second or third joint; these shoots always show fruit, but only one or two should be left on each plant at first, and more as the plants get older and stronger. The stopping of the shoots must be continued at every second or third joint from the last pinch, and also thinned out when needful. Crowding of the wood and foliage should always be avoided. The object of planting 2 ft. apart at first is only to secure a good crop of Cucumbers early by taking one or two fruits off each plant as soon as possible; but this space is too little ultimately for each plant, and when it becomes necessary, every alternate plant may be removed to give the others more room. Watering must be attended to regularly. The bed should be kept moist, and when water is given it should be a thorough soaking till it runs out at the bottom of the bed, and should always be of the same temperature as that of the soil. Syringing in the morning and afternoon must also be attended to, and air more or less should be admitted according to the state of the weather. The roots should be top-dressed every two or three weeks with a little fresh soil. If these simple directions be carried out, a supply of Cucumbers during the winter and spring will not be found a difficult matter. The Cucumber is an easy plant to grow; unlike the Melon, the fruit is not wanted ripe, but only when half swelled; and the way to obtain it is to keep the plants in a healthy growing state.

**Cucumbers in Pits, etc.**—Where hot-water pits are employed for growing winter Cucumbers, it is a good plan to apply a thick lining of fermenting material round the pit; also a covering of mats or other warm material over the glass during the night: by these means less fire-heat will be required, and the plants consequently kept in a healthier condition. To train Cucumbers pieces of wire trellis-work should be fitted in each light about 1 ft. from the glass, the bed containing the plants being about 8 in. or 9 in. below this, which will afford greater facility for applying top-dressing; whereas if the ordinary mode of pegging down be adopted, top-dressing cannot be given without injury to the foliage. The greatest objection to pits for winter Cucumbers is the inconvenience of attending to the plants in severe weather; and plants are frequently allowed to run wild and get dry at the roots, in consequence of not being able to take off the lights when there is a continuance of frosty weather. Where there is no other convenience for growing Cucumbers in winter, a few plants may be put into large pots and placed in corners of a warm house, such as a Pine or plant stove. The pots should be well drained, and filled three parts full of compost, adding a little at a time, as the plants require it, until the pots are full. Plenty of water must be given them, without causing the soil to become sodden, and when they are in bearing occasional soakings of manure-water will be beneficial in keeping them in a healthy state.

**Summer and Autumn Cucumbers.**—Plants put out in September will, if properly treated, continue in bearing until May or June; therefore, to have plants ready to succeed them, a sowing should be made early in April, and grown in either houses, pits, or hotbeds, whichever is at hand; these will generally continue in bearing until August, by which time plants that have been put out in cold frames, such as those in which Potatoes have been grown, will be in bearing, and these, if liberally treated, will give a supply far into the autumn. They will, however, require to have linings applied, and be covered up at night when the cold nights set in. If thus treated they will last until late in October, by which time those planted for winter will be progressing towards fruit-bearing. Where a hot-water pit can be spared, a few plants may be put out in July or August, to give supplies during the early part of the winter.

**Growing Cucumbers on Hotbeds.**—Though hotbeds have been superseded to a great extent by hot-water pipes, they still occupy an important position in gardens, especially in those of moderate extent, and are often very serviceable as Cucumber and propagating frames combined. Hotbeds are, as a rule, rather difficult to manage properly, as the heat cannot always be efficiently regulated. A moderate and steady temperature is what is required, and this can be secured in a well-made hotbed for six months. The materials required for a lasting hotbed are stable litter and leaves in equal quantities: in the absence of leaves, use half-decayed hotbed manure, refuse turf-choppings, or any other materials likely to moderate the fermentation of the stable litter—materials to be had in most establishments. The first consideration is the selection of a site for the bed, which should always be in a dry and sheltered situation. Nothing extracts heat so rapidly as cold winds; indeed, where a hotbed is made up annually, it is better to have it sunk two-thirds in the ground. It would be preferable, in fact, to have it wholly in the ground, but as the bed will settle down at least one-third of its height during the summer, the frame would get below the ground-line, which would be inconvenient. For a frame 9 ft. by 5 ft. the pit would require to be 14 ft. long and 10 ft. wide; and if the bed were intended to last eight or nine months it should be quite 4 ft. deep—which, allowing one-third of the bed to be above ground, would give a total breadth of 6 ft. of fermenting material. If the pit be double-boarded with strong rough deal, so as to form a 2-in. cavity all round between the earth and the sides of the bed, the heat will last a considerable time longer, as the cavity prevents the bed from being robbed of its heat by the cold earth. Another advantage of having a pit for the bed is that the latter is made with greater facility, for it requires a skilled hand to build up a compact and permanent hotbed on the surface of the ground. Whatever kind of site is prepared, the next step is to have the materials placed conveniently near. These may be thrown roughly together the first time, sprinkling plenty of water upon them if they be at all dry. In a week or ten days the heap will usually be found to be heating violently, when it should be turned over again, taking care to mix the litter thoroughly, adding more water if required. A week or so later it will want another turning, which as a rule ought to be sufficient to bring it into a fit condition for making up into a bed, even though it be heating strongly, for the temperature will subside a good deal after the materials are well trodden down. Where the hotbed is the only accommodation, the seed of course cannot be sown till the bed is ready; but where there is a hothouse or pit, it is by far the best to sow the seed about the time the first preparations are made for making the bed; and when the bed is ready the plants will be strong and fit for planting. The seed may be sown in small pots, well drained, and the seeds covered with about ¼ in. of fine soil *plunged* in a bottom-heat of 75° or 80°, with a atmospheric heat of from 65° to 70° at night, and 75° to 80° by day. The seeds should not be watered for a day or two after planting, when they should be well soaked; and from this time forward the soil about the roots of the plants should never be allowed to get dry, nor wet enough to become sour. When the plants are up they should be placed near the glass, to keep them strong and stocky, and should be planted out before they become pot-bound. In preparing the bed for planting, the bottom of the frame should be covered with turves, grassy side downwards; on the top of these lay a ridge of soil the whole length of the frame. This should afterwards be levelled up, as the plants root out in both directions. Frequent soilings are an evil in hotbed culture, for such operations cannot be performed without disarranging the foliage and injuring the plants. The bed being prepared, and presuming the bottom-heat to have subsided to about 75° or 80°, the plants should be planted, one in the centre of each light. If not done before, they should at the same time have their tops pinched off above the second or third leaf. After planting, with the assistance of linings, in the shape of stable litter and a careful economization of sun-heat, the bottom-heat may be kept at 70° at least, and the top-heat at 70° at night, and 80° or 85° with sun. In very bright weather a shading of thin canvas should be rolled over the frame during the hottest part of the day, but shading should not be resorted to more than can be helped. Air must be admitted at all times, and even in severe weather the sashes should be raised the thickness of a label to let the steam escape. The bed should be kept moist, but not sodden, and the plants should be sprinkled every afternoon in bright weather with soft, clean, tepid water. Under this treatment they will soon start into growth by sending out two strong leaders below where they were pinched. One should be trained towards the back of the frame and the other towards the front, and when they have come within about 1 ft. of the sides of the frame they should be pinched again, which will cause them to throw out laterals, showing fruit in all probability, which, with the exception of three or four on each limb, should be picked off, and the laterals stopped one joint beyond the fruit. If the foliage be large and vigorous, it will perhaps be found advantageous to cut out some of the laterals altogether. It is much better to thin out the foliage and wood frequently than to let the plants get overcrowded, and then cut out a great quantity of wood at one time. After this the training of the plants consists in laying the shoots out, so as to cover the bed, stopping them regularly, and disposing of them generally so as to secure the greatest amount of light and air possible to every leaf. The plants should not be allowed to bear too heavily, if expected to keep up the supply for any length of time. When cropped moderately, and the fruit cut as fast as it is ready, the plants bear continuously from April to November. Mr. Groom, of Henham Hall, adopts a very good method of making hotbeds; they are made with hollow bottoms, which are advantageous in many ways. He builds up corner piers of brickwork to the required height, say 2 ft. in front and 2½ ft. at back; strong bearers are then laid lengthways on these piers, and stout planks crosswise on the bearers to form a floor, leaving sufficient apertures for the heat to pass through. The frame is then set on and a layer of leaf-mould put into it 2 in. or 3 in. thick, to keep down the steam. A load of strong, fresh manure is then put under the frame and enclosed all round with litter or garden refuse of any kind that may be at hand. In the course of a week the heat is up and the bed fit for planting, and by taking away or adding to the heating material underneath, the temperature may be regulated to a few degrees. Where brickwork cannot be used for the piers, stout posts will answer the purpose equally well.

**Varieties of Cucumbers.**—In consequence of so many so-called new varieties of Cucumbers having been recently added to our lists, it is almost an impossibility to say with any amount of certainty which is the best to grow. These varieties of recent introduction are invariably long-growing kinds, suitable for exhibition purposes, but far from being useful to growers whose aim is to keep up a constant supply. For general use a Cucumber 12 in. long is just as good as one twice that length; and where one long one is grown, two or three short ones may be had with less injury to the plants than the long one. Where, however, Cucumbers are placed upon the table whole, one likes to see a creditable fruit,—therefore in this case a long-growing variety is to be preferred; but where, as is generally the case, they are cut up before being sent to table, flavour is the only thing that need be studied, and short Cucumbers generally have the advantage in this respect. Perhaps, taking all things into consideration, there is no better variety to suit all purposes than Rollisson's Telegraph, when it can be had true. There are also many others called Telegraph, closely allied to it, that are excellent, but the former is the best. There are two or three old varieties which we now seldom see, but that are not excelled for flavour and cropping qualities: we allude to Lord Kenyon's Favourite, Masters' Prolific, and Hedsor. These are all short sorts, but heavy croppers and of excellent flavour; the latter, I believe, is the only variety grown at Frogmore, and it answers exceedingly well as an all-the-year-round cropper. Amongst the best of the long varieties may be mentioned Pearson's Long Gun, a fine variety when true. Mr. Pearson used to make a speciality of growing this variety for seed, and so careful was he not to cross it with any other kind, that he would not allow any other to flower in his garden whilst growing seeds of Long Gun. Tender and True is an excellent kind for exhibition, also Marquis of Lorne and Daniels' Duke of Edinburgh. Blue Gown is a good black-spined sort; but where only one kind can be grown, we should recommend Telegraph or Lord Kenyon's Favourite. When selecting the kinds of Cucumbers for cultivation, we must not forget to choose those best adapted for our several requirements. Many varieties will do well in houses in a high temperature, but are useless for growing in frames, and *vice versâ*. Some will succeed without bottom-heat, and in a very low atmospheric temperature, whilst others require a large amount of both bring them to perfection. This is generally the case with long-growing kinds. Fertilization was formerly considered necessary for the setting of Cucumbers, but it has long been proved to be needless. Indeed, fruits intended for eating are better without, as the seeds in them are not so numerous. For seeding purposes fertilization is decidedly required, if good, heavy seed be needed.

**Soil and Manure.**—A great depth of soil is unnecessary for Cucumbers; indeed, it is to be avoided, for they will succeed far better if they be planted in a little soil at first, and receive frequent top-dressings afterwards; for planting, 8 in. or 10 in. of soil is quite deep enough if the bed receive slight dressings of stable manure mixed with soil to keep the plants in a vigorous state of health. Good turfy loam mixed with rotten manure is the best material in which to plant them, but the dressing should be of a richer nature. Many people use a quantity of peat mixed with the loam for winter Cucumbers; others use leaf-mould, but it is too light; the plants thrive well in it, but do not last so long nor fruit so freely as when grown in more holding soil. Cocoa-nut fibre refuse is highly recommended by some as a good dressing for Cucumber beds; but stable manure is by far the best kind of surfacing, and may be applied fresh from the stable, and if a little old mortar or brick rubbish be mixed therewith it will be better still. Weak guano-water is the best kind of stimulant to apply to Cucumbers; other kinds of manure-water are said to affect the flavour of the fruit. I have found a sprinkling of Standen's Manure over the surface of the bed highly beneficial to plants becoming nearly exhausted. Abundance of water is at all times necessary to Cucumber plants growing under advantageous circumstances.

**Growing for Exhibition.**—Cucumbers intended for exhibition should be grown on plants just coming into fruit, as the best fruits, as a rule, are produced from young plants in full vigour. Two fruits of a size are quite sufficient for one plant to bear, though smaller ones may be coming on in succession. Vigorous old plants will also produce fine fruits if kept free from bearing for a short time, and young shoots encouraged. The straightest fruits are produced in sunless weather, but shading has no effect in sunny weather to keep them from growing crooked. The best plan is to give air very freely and to keep the surface of the bed and path moistened. Care must be taken to tie up the fruit, lest the bloom, which is as indispensable to Cucumbers as to Grapes, should be in any measure destroyed, or the flower at the end displaced. It is of the first importance to have them fresh; better to sacrifice a little in the way of size than to have them past their best. It is also a point of importance to have a brace equally matched. Cucumbers for exhibition are sometimes grown in glass tubes, in order to have them straight, but it is just as good a plan to have a piece of flat lath and tie the point of the fruit gently to it whenever it threatens to grow crooked; care must, however, be taken not to mark the fruit with the tying material. A box should be made about the width the brace will fill, and about their length, in which, when cut, place them immediately without afterwards disturbing them.

**Cucumber Culture in the Open Air.**—Any one having a warm garden may, with a little contrivance, have Cucumbers from July to the middle of October. A warm situation, with a southern aspect, should be chosen for them. Then remove 1 ft. or 2 ft. of soil over a surface a yard or so wide, fill up the space so formed with some heating material—such as leaves, stable litter, tan, chips, or Cocoanut-fibre refuse. Cover this over with the soil removed; the seeds may then be sown on the bed, or plants previously prepared may be planted. The latter is by far the better course, as by this means much time is saved, and the heat of the artificial bed quickly pushes on the plants. The seeds for this purpose should be sown under glass, if possible, two or three weeks before this growing bed is formed in the open air. As soon as the plants have formed a rough leaf beyond the two smooth cotyledons, they should be potted off singly and deeply, so as to bury all the stem up to the cotyledons. By the time the plants have filled a 60-sized pot full of roots, they will be in the best possible condition for planting out on the bed already described. After planting, it is a good practice to cover the plants over with a bell-glass, cloche, or hand-light, or any other kind of glass protector, until they get a firm hold of the soil. This helps them the sooner into free growth and plentiful fruit-bearing; but still the glass covering may be dispensed with. In that case, however, it will hardly be safe to plant out until the end of June, or, if planted earlier, a flower-pot or old hat-box, or a double paper protector had better be placed over them every night until all danger from frost is over. One of the simplest protectors for such plants is a wooden box 6 in. or 8 in. square, and 10 in. or 1 ft. deep, with the upper side covered with oiled calico drawn tight. But, by planting strong plants late, we may dispense with all these coverings, and also with the artificial bottom-heat, although it undoubtedly affords a powerful stimulus to growth. Outdoor Cucumbers may either be grown on the ground or slightly raised above it on trellises of various sorts, or they may be trained on walls and fences or other vacant places. The surface of the earth is, however, perhaps the best position for them, for there they have congenial warmth, and the leaves are strengthened by the evaporation of moisture from the ground. The foliage as well as the roots are also readily watered in such a position, and the roots are so shaded as to protect them from being scorched by the sun. The necessary training, stopping, and cutting of the fruit are likewise easily attended to when the plants are allowed to ramble freely over the surface. Outdoor Cucumbers are generally allowed more freedom of growth than those in frames or houses. In the latter the plants have to be kept pinched back for want of space, and to keep the plants in bearing as long as possible. But in the open air, as the object in view is to obtain a quantity of small fruit as quickly as possible, the plants may be left to themselves, with the exception of a weekly overhaul to cut water, etc. Cucumbers succeed well when trained up south or west walls, planted either on the top of small heaps of fermenting material, or simply in warm borders. Well watered, carefully stopped and trained, many of the shorter frame Cucumbers will do fairly well in such positions; and even the long varieties, such as the Stockwell Long Ridge, the Long Prickly, etc., thrive tolerably well. The plants must be watered freely at the roots, and be sprinkled overhead once or twice a day. Cucumbers may also be successfully grown between rows of Raspberries or espalier fruit trees. A good spit of soil should be taken out where each of the plants is to be put, and a good spadeful of rotten manure worked in the hole. The plants may be put 3 ft. apart, and trained horizontally, so as to meet each other, when they should be stopped. They will then soon throw out side-shoots, which should be kept regularly pegged down to the ground. Give plenty of water in dry weather, and abundant crops of Cucumbers will be the result. Even those who have no garden may grow their own Cucumbers for pickling, salad, and eating, on a stone yard or balcony. The varieties already named, as well as the Short Prickly and Cluster Gherkin, may be grown in pots, boxes, or vases, and would prove quite as interesting, and almost as ornamental, as many of the common plants often found in such positions. In almost any soil Cucumbers will grow, provided it is open and rich enough; though, of course, the orthodox mixture of turfy loam and rotten manure is the best for those in pots and boxes out of doors. The pots and boxes should be well drained,—a matter even of more importance than the soil, for the latter can always be enriched by manure-water. Care must, however, be taken not to over-stimulate outdoor Cucumbers, as gross growth is apt to invite mildew, one of the greatest enemies to Cucumbers in the open air.

**Cucumber Culture in Market Gardens.**—This is one of the most extensively grown indoor crops in market gardens, some growers devoting immense ranges of glass houses to its cultivation, while others grow it very largely in frames or sunk hotbeds. Some idea of the extent of its culture may be obtained from the fact that one grower at Fulham has annually a field of frame-ground containing many ranges of frames with from 800 to 1000 ordinary sashes; other market gardeners grow in proportion. From this field are sent to market weekly during the summer from 180 to 220 dozen of fruits. The Telegraph, and varieties of it, are much grown in frames; so is the Syon House, Pettie's, and a few other sorts. These kinds, together with the Rabley, Duke of Edinburgh, Sutton's Perfection, and a few others, are chiefly used for growing in span-roofed and lean-to pits or houses. For frame-work the first sowing is made in little punnets or flower-pots, which are placed in hot-manure frames. When the seeds germinate and are fit for potting-off, two plants are potted into a 6-in. pot, and the whole replaced in the frames, keeping them near the glass. About the middle of February, as soon as the frames can be spared, they are moved aside, and trenches cast out 5 ft. wide and 2 ft. deep, and firmly filled with stable litter once or twice turned. Over this some soil is placed, and the frames set on again. The earth that was cast out of the trenches almost levels up the space between the frames. When the heat is at a proper temperature for planting, a little more soil is introduced to the frames, one potful (containing two plants) is planted under each sash, and one of the plants is trained towards the front of the frame and the other towards the back. The sashes are then put on, and all is kept close for a few days; and, if need be, a little shading is also given by strewing some litter over the glass. Afterwards, until the plants have fairly begun to grow, no more ventilation is given than is necessary to prevent scorching in the case of bright sunshine. Another sowing is generally made to succeed the first one; but, as a rule, there are seldom more than two sowings made, and the second is only sown because all the frames are not empty at one time, to be filled by the first sowing. Where great pains are taken the earliest plants retain their good bearing qualities as long as the latest-sown ones. For several weeks after having been planted they are protected at night by covering the sashes with litter, removing it next morning; indeed, this covering is not discontinued until the month of June. When the plants have grown sufficiently to come into bloom, they are most attentively looked after in the way of regulating the growths, pegging down the vines, stopping the shoots at the joint beyond the embryo fruit, and preventing an accumulation of superfluous growths. Throughout the day they are allowed to have plenty of air during the summer, but it is all shut out at night; in the morning the sashes are tilted up a little, and as the heat of the day increases the sashes are still further opened. Water is given in the morning abundantly to those requiring it, whilst those that are not dry have simply a sprinkling overhead. It is cold water from the tap that is entirely used; and doubtless this is the greatest drawback to Cucumber growing with which the market gardener has to contend, as where one or several acres are covered with frames, it would be almost an impossibility to make tepid all the water that would be required. Large hogsheads, however, are sunk here and there about the frame-ground, and brick or cement tanks are frequently used for containing water, with which they are filled for the next day's use. Guano-water is sometimes given during the summer time, being applied through a fine rose overhead. This application is not only useful as a stimulant, but when given overhead has been found to be of material benefit in destroying or preventing red spider, as well as invigorating old plants. In reference to woodlice, toads are put in the frames to destroy them. A couple of men are usually kept at work in the frame-ground; on three days of the week (Monday, Wednesday, and Friday), they are employed in cutting fruits for market, and on the other three week-days they are busy stopping and regulating the vines. Should any young fruits exhibit a tendency to become crooked, they are put into cylindrical glasses open at both ends. These glasses are about

12 in. or 15 in. long, and 1½ in. or 2 in. in diameter; and several thousands of them are employed in one large frame-ground, as one good and straight fruit is worth nearly a dozen small and deformed ones. The crooked ones do for pickling. Cucumbers require sunny weather to set well, and in dull wet seasons they do not thrive, especially in the earlier part of the year. Should the summer be hot and bright, the sashes must be shaded a little, and this is done by strewing some rank litter over the glass; but many market gardeners, by way of economy of labour, paint the sashes with whiting, as in the case of glass houses. By August the plants are getting exhausted; therefore careful attention is paid to thinning out old and bare vines, and encouraging young wood by means of stimulants, in the way of manure-water and coverings from cold; and in this way they last till September. In August some fruits are saved for seed, for if left sooner they would materially weaken the crop of marketable fruit. Should any "nosed" fruits be detected, a piece of string is tied round them and they are left to ripen, as they are almost certain to contain good seed. When the seed fruits become yellow and are cut, they are placed under sashes or on boards before the sun, so as to get thoroughly ripe and hard before being separated from the pulp. In some market gardens narrow, span-roofed houses are employed for Cucumber growing, and these are doubtless the best kind of structures for the purpose; but in some cases very roughly-constructed places are used with the best result. For example, in a village near London there is a small garden devoted to Cucumber growing for market, where the most simple means are employed and the best results obtained. The structures, or houses as they may perhaps be called, are primitive indeed—the first house being an ordinary lean-to against a brick wall, about 20 yds. long and 10 ft. wide. In front of this is another of the same length and width, but with a span-roof, also a little glass under the front plate. These structures are low; but to get head-room a pathway is sunk along the middle, perhaps a yard deeper than the ground-level. On either side of this pathway is a long wooden trough from end to end of the house. These troughs are the most noticeable feature of the whole affair; they are of rough inch-boards from 2 ft. 6 in. to 3 ft. wide, and 10 in. deep, the soil used being decayed turf full of vegetable fibre, mixed with decayed horse-droppings. The troughs are not quite filled at planting out, and as the mass gets filled with roots, a slight top-dressing consisting of road-grit and well-decomposed horse-droppings is from time to time applied. The idea is correct—viz., that slight dressings, frequently applied, maintain health without over-stimulating. The point most noticeable is the small modicum of soil allotted to the plants: they stand about 2 ft. apart; they are grown with straight stems, about 12 in. or 18 in. long, and are trained on temporary trellises, 1 ft. from the glass, which is evidently not far enough, as both cold and sun affect them at that distance. The heat is supplied by means of flues—that is, 9-in. socket pipes put together with cement do

duty as brick-flues. A row of these pipes is carried along on either side under the middle of the troughs. In excavating the path the side earth is left; on the top of this run these pipe-flues, almost close to the bottom of the troughs in which the plants grow. This flue is the only source of heat; in severe weather straw mats are put on, and are found to be of great service. The cubical contents of one of these structures is very little; and, limited as the surface is, it can readily be covered up to economise the heat given off inside. The plants for bearing all spring and summer are put out in the early part of winter—the object being to have plenty when the demand is good. The quantity of fruit produced in these small houses is something marvellous. They are cut three times a week, and supplied direct to the consumers,—only the rough ones are sent to the market for what they will bring. The sort this grower prefers above all others is Sutton's Perfection. Telegraphs and various other esteemed sorts are grown, but no sort, in his opinion, is equal to Sutton's. The culture of the Cucumber in the open air is now seldom practised by market gardeners in the neighbourhood of London. Many have attempted it, but we believe most of them have now abandoned it, the result not having proved sufficiently encouraging for them to persevere in the matter. Where, however, it is carried on, they are grown under glass, and hardened off, and planted out 6 ft. asunder and 10 ft. row from row, and hand-glasses are put over them. When they begin to grow the ground is well mulched with straw, to keep the earth moist and the fruit clean. Due attention is paid to their after-culture in the way of stopping, thinning, etc., and in many cases good results are obtained. In some seasons, however, Cucumbers form a somewhat uncertain crop in open fields, some localities being unsuited to their culture; but still, while their produce is in such demand in all large towns, their culture might be profitably extended. At present it is confined to comparatively small spots in one or two counties, the soil and climate of which seem unusually well adapted to their growth. Small, however, as the area at present under Cucumber cultivation is, it is reported to furnish to the London markets not less than 600 tons a week during what is termed the Cucumber season. Of these upwards of 100 tons have been known to be sent to Covent Garden in a single day. They are largely grown at Sandy, in Bedfordshire, and at St. Neot's, in Huntingdonshire. They are packed in square baskets and conveyed by train to the London and other markets. In the neighbourhood of the stations just named Cucumbers are grown by the acre in the open field, many cultivators having as many as ten acres at one time under this description of crop. The soil in the neighbourhood just indicated is, for the most part, a warm, lightish loam or gravel, in every way suited to the growth of this esculent. The ground to be planted is well prepared during winter, and again deeply stirred and otherwise put in good order in spring. The seed is then sown about the beginning of May, where the plants are intended to grow, in rows some 4 ft. apart, and the plants stand nearly 2 ft. asunder in the row. In favourable seasons they soon push into active growth and cover the ground with vines, which, during the latter end of May, the whole of June, and beginning of July, spread in all directions and come into bearing. During their growth, weeding and thinning their superfluous shoots are well attended to; and if the plants should not entirely cover the ground, or wherever blanks occur, Mangel Wurzel is planted in the vacant spaces. About 4 yds. apart are also rows of Onions, set early in the spring, which, being allowed to run to seed, serve in some measure both for shade and shelter. Where Onions are not used for this purpose, Rye, sown in the autumn, 4 yds. or 5 yds. apart, and cut as soon as the vines cover the ground, is employed instead; Peas are also sometimes used for the same purpose. In this way the ground is induced to produce two or three kinds of crops at the same time, and if one should happen to fail, one or more of the others, as the case may be, take its place. By the middle of July, or earlier, according to the season, the crop is ready for a first gathering; and from that time to the end of September fruit varying in length from 10 in. to 12 in., green and solid, though sometimes unshapely, is continually being cut, sometimes to the extent of 3 tons at a time, and that from little more than as many acres. What an acre of Cucumbers realises in the way of money we are unable to say with certainty; but they are stated to yield a good profit to the grower, even if he should get no more than 1d. or 2d. a dozen for them. At these prices sums varying from £20 to £60 an acre, according to the season, are said to have been obtained for them. When gathered they undergo the process of sorting—the best being generally sent to London, second-rate kinds to the provincial markets, and what are small, crooked, or discoloured are given to pigs. Ripe ones are saved for seed, so that little or no waste is ever experienced with crops of this kind. The baskets in which Cucumbers are sent to market are called "pads." In shape they resemble those used by wine merchants—*i.e.*, square with hinged lids—and they generally hold about two bushels. It has often surprised people who think Cucumbers cannot be grown without a frame, how cottagers are able to produce such fine specimens of them as they frequently do at local exhibitions. There is, however, no difficulty in the matter; indeed, the wonder ought to be that Cucumbers are not more extensively cultivated out of doors during summer than they are. The cottager selects the warmest corner of his garden for them. When the spot has been decided upon, two or three circular holes are made, 3 ft. across and about 18 in. deep. These are filled with garden refuse, mixed with some rough manure, and covered about 8 in. or 10 in. deep with some of the richest and best of the soil that was thrown out of the holes. In the centre are sown four or five seeds 1 in. deep, and these are protected by a flower-pot or an oiled paper cap until they have vegetated. In the fields above alluded to, however, no such trouble is taken; the ground is merely, as previously stated, well stirred and worked, thrown into slight ridges, and the seed sown without any bottom-heat or artificial protection whatever. Thus it will be seen how easy it is to have plenty of Cucumbers, with comparatively little expense in the way of preparation or labour; and that, as a crop, they are remunerative, is evident from the fact that ground which would grow cereals or root-crops in perfection is devoted to Cucumbers even by large cultivators of grain.

**Gherkins.**—These are grown for pickling, and should be cut when they are from 2 in. to 3 in. long. Market growers generally allow them to be larger. They may be easily grown out of doors in warm situations. If the plants be raised in heat in May and planted out of doors in June, and hand-lights placed over them for a week or two, success is more certain. Some gardeners plant them in spare frames during the summer; but they do almost as well in the open air, inasmuch as they keep more free from insects when exposed to air and rains. Market gardeners sow immediately in well-prepared ground, and plant them 6 ft. asunder and 10 ft. from row to row; and one grower has been known to cut 20,000 fruit in one day, which are quickly bought up by the pickle merchant. The same treatment applied to outdoor Cucumbers answers for these, only that Gherkins do not require to be stopped.

**Insects and Diseases.**—Cucumbers are liable to red spider, thrips, green fly, mildew, canker, and various other diseases; the only remedy being that of keeping the plants in as vigorous growth as possible. When mildew attacks the Cucumber it is generally the result of insufficient ventilation and too low a temperature. When it does appear, dusting thinly but evenly with flowers of sulphur through a piece of muslin cloth is the only cure. Thrips are the most terrible of the insect enemies which attack the Cucumber: for these, and also for green fly, which is sometimes troublesome on the young growths, fumigating with tobacco is usually resorted to; but the foliage of the Cucumber is so tender, especially when forced, that fumigation, unless done very carefully, is a cure which is often worse than the disease, and should never be attempted by the inexperienced. For these pests, and also for red spider, it will generally be found best to apply the "Antidote for Red Spider, Thrips, and Green Fly," by putting a small quantity in the water with which the plants are syringed. This will, if persevered in, obviate the necessity of fumigation, and keep the foliage fresh and green. Canker in the stems may be stopped by filling up the fissures with quicklime.

## Chicory, or Succory

(*Cichorium Intybus*).

This is a plant distributed over a vast portion of Europe and Asia, and quite common on our chalky soils in some counties. Although it is seldom seen in gardens, a few rows of it ought to be in every good garden, for the sake of the blanched leaves in winter. It is in this form used to a vast extent in Paris, under the name of

Barbe de Capucin, and is a really excellent salad. For some tastes it may be too bitter, but the addition of a little Corn Salad or Beetroot modifies this. It is as easily grown as any common weed; only as, to obtain the creamy white salad in winter, we must take up the roots, it is better to sow it in an open rich soil where it may grow vigorously and be easily taken up, and in drills 18 in. apart, thinning the plants to from 9 in. to 12 in. in the row. Some authorities say the seed ought to be sown in June, but April is the best time.

**Forcing.**—As to forcing it in winter and spring, nothing is required but to take the roots up carefully, and put them in some dark warm place, with a temperature of about 60°, in rough boxes, or directly on a bed. The French grow it on a large scale for market, and their system of growing it in caves or cellars on an extensive scale is not such as we should pursue, unless the plant should find its way into common use. Wherever Seakale, Rhubarb, or Asparagus is forced, its production is a matter of little difficulty. It is sometimes used as in a small salad, the seed being sown thickly in heat, and the leaves cut and used when very young and soft. It is in no great request by those who can produce fine Lettuce, Endive, Celery, Corn Salad, and other small Salad plants in abundance; but for the amateur it is invaluable, on account of its easy culture and wholesome properties at a season when other Salads are scarce.

## Corn-Salad, or Lamb's Lettuce

(*Valerianella olitoria*).

THIS plant, found wild in many parts of Europe, and abundantly used as a salad on the Continent, is not grown so much with us as it deserves. There are few salads superior to this, with a sprinkling of half-blanched Celery, both to be used in a fresh, clean, and crisp state, in which condition they are not always found in markets. Of course, we suppose them to be dressed with good oil in the proper way. Nothing is easier of culture. Two kinds are in cultivation: the Round and the Regence. The former, which grows spontaneously in all meadows of our latitude, is sown in market gardens from the month of August till October, among plantings of Cauliflowers, Endive, or Chicory; the surface of the soil being merely scratched before sowing, and then lightly raked over. In September it is sown along with Onions which are not to be transplanted, or it may be sown among the same kind of Onions if transplanted, or with Welsh Onions, taking care to have a good layer of spent manure. The Regence is sown broadcast at the end of September, or in the course of October, in beds prepared to receive transplanted Onions, or in empty beds in which it is intended to sow Melons in April. The August sowings yield a crop in October; the September sowings yield in November, and all the winter until March, when the plant runs to seed. The Regence is the latest, its last crop being gathered in April. In order to obtain good and true seed, a bed must be prepared on purpose, being first dug over and then levelled and compressed by placing a plank on the surface and walking upon it. The largest plants are then put in as thickly as possible. The seed is swept off the ground with a broom, which explains the necessity of having previously made the surface hard and level. The seed keeps good for two or three years. In order to separate it from the dirt which is swept up along with it, it is thrown into a bucket of water; the seed will float while the earth sinks to the bottom. The seed is then collected and dried in the sun. The weeding of the seed-bed should be well attended to.

## Dandelion

(*Taraxacum Dens Leonis*).

The Dandelion, as every one knows, is a weed to be found in almost every meadow or wood; it is nevertheless valuable both for medicines and salads, for which latter purpose it is often cultivated in English and French gardens. It is sown in March or April in deeply dug ground, or roots obtained from the fields or elsewhere, and planted 6 in. or 8 in. apart. In the following spring, when the plants begin to grow, they are covered over with sand or soil to a thickness of 3 in. or 4 in. As soon as the leaves begin to push through the sand, they may be cut close to the ground in the same way as Chicory. The flowers should be kept picked off in order to prevent their seeding and covering the garden with weeds.

M. Ressin, of Paris, writes of an improved Dandelion in the following terms:— "In the beginning of May, 1870, we sowed some seed of this Dandelion in a well-prepared bed, in which the roots could easily develop themselves without meeting with any obstacle. The young plants soon appeared above ground, and in autumn we were able to cut from them great quantities of long and large leaves, which made an excellent salad. Others were cooked the same as Chicory (Endive), and were found to be very good. During the siege, ordinary Dandelions were sold retail in Paris at from three to four francs per pound. The improved variety is, however, so unlike the common kind, that each head of it might easily be mistaken for a large Batavian Endive, were it not for the colour, which is not the same. In winter we blanch wild Chicory in cellars, and in the bed in which it grows is also put the improved Dandelion, which produces leaves in equal abundance; and thus during the entire winter we are provided with blanched leaves of both plants, which are both wholesome and palatable."

## Dill

(*Anethum graveolens*).

A native of Spain; seldom grown in England. Its uses are for flavouring soups, sauces, etc., the young leaves only being used for this purpose. The seed may be sown broadcast or in drills in spring, in any spare corner, and if the flower-stalks be allowed to remain and seed year after year, plants will be produced in abundance without further trouble.

## Egg-plant

(*Solanum esculentum Melongena*).

THIS is a native of America, in which country it is largely grown, and whence its fruits are imported to Covent Garden Market, where it realises high prices; these are, however, not in such perfection as they are often found in America, for Mr. Taplin writes:—

"I learn from a contemporary that fruit of this plant has been offered for sale in English markets; but from the description given of it, the variety must either have been a poor one or its cultivation could not have been well understood. I see no reason why this fruit should not make a useful item in mixed pickles, although I have not seen it used in that way; the size and shape mentioned—viz., 6 in. long by 1½ in. in diameter—would be a convenient size to cut up for that purpose, and would be of no use for cooking. This fruit, like its near relative, the Tomato, may be improved by selecting the best for seed: a fact of which I have taken advantage by saving the best each year, until I have obtained a very fine "strain."

"I consider the fruit of this plant to be one of the most delicate additions to our very extensive list of summer vegetables; when nicely cooked it tastes more like Apple fritters than anything else to which I can compare it. Owing to the plant itself being much more tender than the Tomato, it is useless to plant it in the open ground in England; but it would succeed on hotbeds under frames, or, better still, planted in pits heated with hot water, so as to furnish a bottom-heat of about 80°. It is a compact grower, and if cramped in pots or planted in close corners it would be smothered with red spider, and of course prove a failure. In America we sow the seed about the 1st of April in a hothouse, prick off the young plants as soon as they are up, and pot them into small pots before the roots become much entangled,—shifting once or twice, the last time into 6-in. or 7-in. pots. We keep them in a night temperature of 65° until the middle of May, and then harden them off by degrees until about the 7th of June, when they are planted outside. The ground being by that time well heated by the sun, they make rapid growth, and would astonish those who had only seen the starved specimens grown in pots as curiosities in English greenhouses. A dozen plants yield abundance of fruit for the supply of a large family. The only attention required after planting is to keep down weeds, and, if the weather be very dry, to give one or two good soakings of water. The hotter the weather the faster the plants grow. Here the soil is frequently over 100°, yet we think it necessary to plant our Egg-plants in a sheltered spot exposed to full sunshine. The plants when young are very tender, so that if fumigation be necessary they should be removed from the house; and if checked in any way red spider will attack them and soon spoil them."

It will therefore be seen that to grow the Egg-plant in England it must be treated in a similar manner to Summer Melons, or Cucumbers, sowing the seed early in spring and ripening the fruit in autumn. It is, however, questionable whether it would repay the trouble thus incurred.

## Endive

### (*Cichorium Endivia*).

THIS is a native of the East Indies, and in many English and Continental gardens ranks amongst the most important of Salad crops; and during the winter months in large establishments a considerable amount of space under glass is devoted to its culture, or rather protection. It is generally made use of in salads, cut up with other ingredients, but it is sometimes eaten in the same manner as Lettuce. In order to have Endive in its highest state of perfection, liberal treatment is necessary, both as regards soil, manure, water, and timely attention to blanching, sowing, and planting. The first crop to be grown in the open air should not be sown earlier than the end of May, unless heads are needed earlier than sowings made at that time can afford. The evil attending early-sown Endive is that, as a rule, nine-tenths of the plants run to seed; and other sowings may be made at intervals of a fortnight up to the end of August. The seeds should at all times be sown on fine, rich, moist soil, and they may be either put in broadcast or in drills. Many adopt the latter method, and thin out the plants to the required distances apart, instead of transplanting them, as is generally done; and in the case of early crops a decided advantage is thereby gained, inasmuch as, thus treated, the plants are not so liable to run to seed as when subjected to transplantation. In any case the soil containing the plants should be kept in a moist state by means of frequent waterings through a fine rose, if the weather be dry; weeds should be promptly eradicated as soon as they appear; and, in fact, all that is possible should be done to hasten the germination of the seed, and afterwards keep the plants in a healthy, growing state, thinning them out as they advance in growth until they are 3 in. or 4 in. apart, after which they should be allowed to remain until several leaves are made, when they may be carefully lifted from the seed-bed and transplanted on borders, or banks, or wherever they are intended to remain. The distance at which the plants are to stand apart must be determined by the variety grown and the time of year when transplanting takes place. Early and late crops do not require so much room as those that are fit for use in the middle of summer, inasmuch as the plants rarely attain such a large size as those having the warmest season of the year in which to complete their growth; but the average distance will be found to be about from 12 in. to 15 in. each way from plant to plant. It must, however, be remembered that the Batavian Endive always requires more room than the curled-leaved varieties. A warm, rich soil is essential to the growth of Endive,—and in order to guard against mishaps in the time of drought, previous to planting the ground should be deeply dug, and well enriched with good rotten stable or cow manure. In very dry seasons copious waterings will be necessary, in order to keep the leaves in a quick-growing and, consequently, crisp and brittle state—which latter is most essential to flavour and general excellence. Weak manure-water occasionally applied to the roots, without wetting the foliage, will be found to greatly assist their growth.

**Blanching.**—This, as in the case of Lettuces and Celery, is an important matter. Imperfectly blanched heads of Endive, however large they may be, are comparatively worthless. Blanching is generally done two or three weeks previous to the heads being required for use; but if, as should be the case, the plants be allowed to attain nearly their full size before blanching takes place, eight or ten weeks must elapse from the time of sowing before blanching is attempted. Many ways and means of blanching are resorted to by cultivators, the most common being that of laying the leaves together in the same way as those of Lettuces; if tied in two places instead of one, as is often the case—*i.e.*, one in the middle and one at the top—the blanching will be more complete than it otherwise would be. Some invert flower-pots or Seakale pans over the plants, which is, perhaps, the least troublesome method of any. Others cover the heads entirely with dry soil. Straw hurdles, too, put over the plants in such a manner as to exclude light from them, is a very easy and effectual way of blanching, and by continually moving these onward as the heads are cut, a successional supply of well-blanched Endive may be secured. No more than is likely to be used should be blanched at a time, inasmuch as after a certain period flavour and crispness gradually decline. Flat tiles or slates are sometimes used for blanching, first pressing down the hearts of the plants with the hand and then applying the tile or slate, afterwards covering the whole with earth or dry straw. Whatever process of blanching may be preferred, it should at all times be done when the foliage is dry, otherwise discoloured or rotten hearts will be the result. Taking all things into consideration, there is, perhaps, nothing better for blanching Endive than the common flower-pot, or seed-pans without holes in the bottom.

**Protecting.**—Plants from the latest sowings will seldom be off the ground before frost sets in, therefore if it be desirable to prolong the Endive season as much as possible, some means of protection must be provided. Many lift the roots and store them in sheds or cellars, planting them in dry earth and blanching the tops as may be required. The best way, however, is to have a pit or frame provided for them, choosing a bright day in October to lift the plants with as good a ball of earth adhering to the roots as possible, and plant them as far apart in the frame as is consistent with the space at command. The quality of the soil in which they are planted is not of great importance, considering that the plants will not grow much after they are put into the frames. It should, however, be within 12 in. or 18 in. of the glass, and after planting should receive a good soaking of water to settle it well about the roots, leaving off the lights until the severity of the weather necessitates their being again put on. During very sharp frosts, a little litter or similar material placed over the glass will probably be necessary by way of protection. By blanching a portion of the plants at such a time as may be required, a good supply may be kept up till Christmas. Some allow their Endive to remain in the ground, covering it with spare lights, hand-glasses, or cloches during cold weather; others employ straw hurdles, mats, etc.; but nothing equals putting it into a pit or frame. The ground rendered vacant by the removal of the plants can then be dug or ridged, and exposed to the pulverizing influence of the weather. Seed may also be sown in cold pits or frames in October, and when the plants are large enough to handle, be pricked out into other frames, on a bed of rich soil; from 6 in. to 8 in. apart will be far enough asunder for this crop, as the heads are never very large. Cover them up in frosty weather, and about the end of November the lights may be kept covered with litter or mats in order to exclude the light from the plants, which will then in a few weeks be fairly blanched, and though small will be found both crisp and good in flavour.

**Forcing.**—When Endive is in request early in spring, it is necessary to have recourse to artificial means whereby to obtain a succession to that stored away in cold pits, or otherwise wintered. Although Endive is seldom forced, it is, nevertheless, well worthy of the trouble which a little forcing entails. In many parts of France Salad-forcing is carried on to a large extent, and is considered to be a remunerative crop. The only drawback to early Endive, whether sown in frames or otherwise, is its liability to run to seed, owing to the length of time which the seed takes to germinate, and the plants to get fairly established. Speedy germination is therefore the principal thing to be aimed at, and in order to accomplish this, bottom-heat is absolutely necessary. Pits and frames are the best structures in which to force Endive—the former being, perhaps, the best when heated with hot-water pipes. Previous to sowing the seed a hotbed should be made on which to place the frames—if frames be used. In the case of brick pits, they should be filled with fermenting stable manure to within 12 in. or 18 in. of the glass. The beds, when made, should be slightly covered with rich mould, the lights placed on them, and when they are found to be sufficiently warm, the seed may be sown thinly and equally over the bed, afterwards making the whole firm by beating the surface with the back of a spade. No further covering is necessary until the plants are above ground, when a slight covering of light soil may be added. A warm, close atmosphere must be maintained until the plants are large enough to transplant, when they may be pricked off in frames or pits in which there is a lower temperature; keep the plants in a growing state, and afterwards treat them in the same manner as those grown out of doors.

**Varieties.**—There are two distinct types of Endive—one with narrow, curled leaves, the other with broad leaves like those of a Lettuce. The Curled-leaved varieties are the handsomest, and are more easily blanched than the Broad-leaved kinds, which require tying in order to blanch them properly; the leaves of the latter are, however, more crisp and better flavoured than those of the former. Amongst the best of the Curled-leaved kinds may be mentioned Digswell Prize, Williams' Gloria Mundi, Large Green-curled, and French Small Green-curled. These are all good sorts, on which reliance may be placed. The last-named is, however, only fit for early and late sowings. The best of the Batavian kinds are Fraser's Improved (a fine hardy sort), Green Batavian, Round-leaved Batavian, and the White Lettuce-leaved Batavian. The best way, perhaps, is to grow a number of varieties and select such as succeed the best.

**Culture in Market Gardens.**—Endive is grown to perfection in the London market gardens, and is ready for use from the middle of August till Christmas. Many growers keep up a supply of it during the winter and early spring by lifting the plants for winter use and planting them in a frame or amongst sand in a shed, and for spring use from late sowings planted out in dry and sheltered soil. As our markets, however, are so liberally and easily furnished with beautiful Endive from France during winter, it would not pay the English grower to cultivate them for the winter and early spring markets. The Green-curled and its dwarf variety are the two sorts most generally grown. In the middle of May a sowing is made either in a cold frame or in a bed of light soil in the open air, and covered with litter like Radishes. This early crop is commonly planted out on the Celery ridges about the middle or end of June, and becomes fit for use in August. Very early Endives are liable to "run" before they fill up; therefore earlier sowings than those of May are not to be relied on. A large sowing is made in the open air in June, and another smaller one in July. The plants in the seed-bed are thinned out a little at an early stage if thick, and are transplanted permanently in rows about 15 in. apart and 1 ft. asunder in the rows, between Celery or between summer Cauliflowers, Lettuces, or Cabbages, or in an open field by themselves. Beyond hoeing no further care is bestowed on them until they have grown enough for tying up, when their leaves are gathered up together and tied round their middle with withies or pieces of matting, like Lettuces. They are kept tied up for a fortnight or three weeks, in order that they may be well blanched for market. In October and November, in favourable seasons, Endives are very fine and abundant in our markets.

## Garlic

(*Allium sativum*).

THIS, though a native of the Mediterranean region, has all the vigour of the hardiest and strongest northern herbs, and though flourishing best in a dry fertile soil and warm situation, it will do almost anywhere. The bulbs are used largely by French cooks for flavouring soups, sauces, etc., but its strong smell and flavour being generally offensive, it is used but little in English cookery. The cultivation consists of planting the cloves (*i.e.*, the separated portions of the bulbs) in shallow drills about 1 ft. asunder, and 6 in. apart in the row, covering them with soil to the depth of 1 in. or 2 in.; or of planting whole bulbs 1 ft. apart each way, and never deep, as wet is apt to get down among the cloves, causing canker and mildew. Merely stretch a line or measure; take the bulbs by the neck and press them half or say two-thirds into the soil; then drop a pinch of fine sifted cinder-ashes over them, to prevent worms from drawing them out of the ground. February is about the best season to plant them. A small quantity may be planted in autumn, if it be desired to have a stock early the following season. From this autumnal or, to speak more precisely, October planting, bulbs may be taken up for use early in the succeeding summer. Any time after the leaves turn yellow the crop may be taken up and dried, hanging it up in bunches by the stalks in any airy room. It requires no further culture whatever, excepting to be kept free from weeds—if it be necessary to mention in connection with any one small crop what is a first necessity with all.

## Gourd

(*Lagenaria vulgaris*).

THIS is a native of India, and embraces all the varieties—which are exceedingly numerous—of the Pumpkin, Squash, and Vegetable Marrow, deriving as they do their origin from the common Gourd. All the varieties being easily crossed, it is found very difficult to keep any one variety distinct, unless each variety is planted a long distance apart. For example, we have often planted Custard Marrow and Long Green Marrow side by side, and the seed saved from either variety produced a large, ugly form of Marrow, altogether unlike the original. Gourds, Pumpkins, and Squashes are principally grown for ornament in this country, some of which are beautifully striped with a variety of colours. In America the Gourd, or as it is termed there the Squash, is extensively grown for cattle feeding, many varieties being held in high esteem for table use. This crop is in fact almost as important in America as the Potato crop is in this country. Very extraordinary curiosities have from time to time been grown in France by grafting different kinds or species of the Gourd one upon the other, as will be seen by the following account.

**Grafted Gourds.**—At an exhibition of the Central Society of Horticulture in France, the public had an opportunity of inspecting the magnificent collection of Cucurbitaceous plants shown by M. Gaillard, and were much struck by specimens of fruit of different forms and colours, which, though united, belonged to different kinds. This was the result of grafting; and, although such unions naturally appear extraordinary to people unacquainted with the art of grafting, yet those who are familiar with vegetable physiology are aware that, under certain conditions, a portion cut off one fruit and placed on another will unite firmly and grow. One condition is indispensable —viz., the fruit must be of an analogous character, and belong to the same family. Another precaution that must be taken is to raise the epidermis, or the skin of the fruit to be united, so as to bring the cellular tissue in course of formation into contact; for, unless this is done, no lasting union can take place. One specimen exhibited was a yellow Gourd, into which had been introduced the stalk of a green Pear-shaped Gourd, from which a large slice had been cut off and replaced by a corresponding section of a white Gourd. In this case a perfect union had been effected. Another was an Elector's Cap grafted upon a green Spanish Gourd. In this case it was sufficient to partly peel the Gourd and make an incision into the tissue, so as to form, as it were, a socket for the cap, which was also peeled so as to expose a portion of the cellular tissue. A third specimen was a Virginian Gourd, the extremity of which had been cut off and a portion of the interior scooped out in order to obtain the seed. This having been accomplished, the two parts were again drawn together with a thread, but in such a manner that they did not fit exactly. In spite of this, however, a union was thoroughly effected. The facility (says the *Revue Horticole,* from which this account is translated) with which Cucurbitaceous plants will unite under the circumstances just described is most likely due to a gummy resinous principle, which is found in the tissues of the stalks and the fruit of these plants, and which assists adhesion in the first place, and then the more perfect junction of the two surfaces.

**Varieties.**—There are two distinct classes of this family of Gourds, one class being termed soft-stemmed kinds and the other hard-stemmed. The principal varieties grown in America are of soft-stemmed kinds: the Hubbard Squash, American Turban Squash, Autumn Marrow Squash, or Boston Marrow (the latter being grown extensively for market in the neighbourhood of Boston). Hard-stemmed kinds are named, Winter Crookneck, Canada Crookneck, Yokohama, and Para. The soft-stemmed kinds are mostly grown for table use, and are more esteemed than the hard-stemmed kinds.

**The Calabash, or Bottle Gourd,** is eaten by the poorer classes in India. The young fruit may be seen exposed for sale in slices in every market, and by vendors on the roadsides. When dried the hard shells are used as bottles for holding water, etc. A variety of it is employed to make the stringed instrument called the Sitar; and also for floats and buoys for swimming across rivers. Some are elongated, and 1½ ft. in depth, while others are nearly round. A half-shell is also used as a dish for meat, rice, and similar material.

We next come to the most important of all to Englishmen,—the **Vegetable Marrow,** by many called Pumpkin. These are largely *grown in England,* and may be found in almost every garden, from *the largest to the smallest.* They are used in a variety of ways, the principal one being that of boiling them when in their young or half-perfect state, like any other vegetable ; they are, however, used in some parts of the country when in a perfectly ripe and dry state. They are cut when ripe, and hung up in a dry room or shed; and in the winter time the seeds are taken from them and the flesh made into pies, with other ingredients. There are many varieties of Marrows, but it is very difficult to obtain them true to name, unless where only one particular kind is grown. Seed being so easily saved, growers generally save their own.

The principal varieties advertised are Hibberd's Prolific, Long-fruited Green, Long-fruited White, and Moore's Vegetable Cream,—the latter being perhaps the best, and more largely grown, than any other. There is a variety called the Custard Marrow, which is excellent to furnish a delicate dish for the tables of the rich. They should be cut when quite young—about the size of a teacup—and cooked just as they are, without cutting.

**Culture.**—Little need be said in this respect, as the Marrow will grow anywhere if supplied with moisture at the root. For early Marrows the seed should be sown in pots and placed in a gentle heat any time in April ; when they have made two pairs of rough leaves they may be hardened off ready for planting early in June. Hand-lights should be placed over them for a few days after planting, until they become established. It is, however, a bad practice to keep the lights on too long, inasmuch as the plants do not grow any faster and they are liable to mildew,—the latter disease being the only drawback to growing Marrows in pits or frames. Some gardeners sow earlier and plant earlier, but there is seldom anything gained by it unless in exceptionally favourable seasons. Marrows are generally planted on old refuse-heaps, or old manure-beds, which places are well suited to their growth. We have seen them planted on great heaps of decayed leaf-mould ; on this they grow and fruit amazingly. They may, however, be successfully grown in any ground by taking out a few spits of earth and digging in a barrow-load of manure. Summer Marrows do well planted in old ditches or dykes that are comparatively dry during the summer months. The usual time for sowing seed of Marrows is in May and June, and it is sown where it is to remain, having a flower-pot or hand-light placed over it until it has germinated. It is a good plan to soak the seed in water for a few hours previous to sowing. The same remarks as to culture apply to all the tribe of Gourds.

**Vegetable Marrow Culture in Market Gardens.**—Vegetable Marrows constitute one of the principal summer crops in the immediate neighbourhood of London, and, where soil and other conditions are favourable, they are very productive. They require, however, a rich and substantial soil, liberally manured, and also one that does not readily become parched in summer; therefore light and dry soils are not so suitable for them as such as are heavier. Mr. Poupart, a market gardener at Bermondsey, used to grow Vegetable Marrows there in great abundance, but when he was obliged to move to the neighbourhood of Mortlake, in order to make way for bricks and mortar, he discontinued their culture, owing to the expense incurred in watering them, and the land being lighter and drier. Their marketable value varies; sometimes they hardly pay the grower, whereas at other times they are highly remunerative—much depending on the scarcity or abundance of Peas, French Beans, Cauliflowers, and other vegetables. One year Mr. G. Steel's first crop became marketable about the first week in June, but he could not command any sale for them, and consequently had to cart the first gathering to the rubbish-heap; afterwards the demand became greater, and the price accordingly higher. Early in March hotbeds are erected for producing Vegetable Marrows, Cucumbers, Celery, and other plants from seeds; the Marrows being either sown thickly in pots or pans of common soil plunged in the beds, or broadcast on a bed with a few inches deep of soil placed over the fermenting material. As soon as the plants show two rough leaves, they are pricked into other beds or into pots. The usual method is to prepare a series of frames set on slightly heated hotbeds; on the surface of these place a few inches deep of soil, into which plunge 6-in. pots, filled with common garden mould to the brims, as thickly as they can be stowed together. Into each of these pots two Marrow plants should be dibbled, and here they should remain till planting time, hardening them off by gradual but increased exposure in fine weather. The first plantation is made out of doors during the first week in April, but the plants make little progress until the end of the month. The ground is marked off in lines for them about 10 ft. apart, and each plant is about 6 ft. or 8 ft. asunder in the row. Where each is to be planted, a hole about 20 in. deep, and 2 ft. or 2½ ft. wide, is dug out and filled with fermenting manure, which is covered over with the soil that has been thrown out in the excavation. Here the plants are planted, the contents of one pot being put in every ridge, and covered over with hand-lights or large cloches. A little earth is at first drawn around the base of the lights, so as to keep all close and free from cold currents of wind; and, in the event of frosty or cold windy weather setting in, mats or litter are also placed around and over the lights. Excited by the heat from the fermenting manure beneath them, and protected from cold overhead, they are almost as snug as in a hotbed, and consequently they soon take kindly to their new quarters, form fresh roots, and begin to grow. When this is the case, the lights are tilted up a little on the south side, by means of half-bricks or small flower pots, during favourable opportunities, but shut up at night. When growth, however, begins to make rapid progress, the lights are left a little tilted up at night, so as not to injure the shoots that are pushing forward and require more room than is afforded under their little glass houses, until finally the lights are entirely removed, which will probably be in the latter half of May. This plantation, when it does begin to grow in earnest, grows most rapidly, and from it fruit is generally cut in the first or second week in June—much certainly depending on the warmth of the season. Large growers have generally from four to six plantations of Marrows, each succeeding the other by a fortnight, so that the last planting is made late in June. The seedlings are all raised on hotbeds, as already described; but I have known instances in which the seeds have been sown in June, in clumps of four, where they are intended to remain permanently in the open fields, and afterwards reduced to two; this plan is, however, a very uncertain one. Until the middle of May the plants are planted out on the manure-pits, as in the case of the first sowing; but less care is necessary for them. Where the supply of lights and cloches is deficient, round vegetable half-bushel baskets are used; but, unless these are covered with mats or litter, in the case of frosty winds the plants beneath them often perish. After the middle of May, lines are drawn on the open fields at the required distances apart, and the Marrows are turned out of their pots and planted in the ground, which receives no further preparation than that of a slight digging. If the weather be warm and genial, they generally do well,—if cold and wet, many of the plants frequently succumb; but the blanks are made up from a reserve stock, which is always at hand to meet such emergencies. Although the distances apart of the first planting is 10 ft. by 6 ft. or 8 ft., that of the June plantations is 15 ft. by 10 ft. or 12 ft., and the intervening crops are planted at corresponding intermediate distances. The earliest crop is planted on ground just cleared of Radishes and Celery; or, if the Radishes be not cleared at the time of planting, the Marrows are planted in every alternate alley between the beds, thus permitting the Radish crop to be removed at convenience. For the later crops, ground occupied by spring Spinach, Radishes, autumn-sown Onions, Cabbages, or Cauliflowers, forms a good medium. The space between the rows is not lost during the minority of the Marrows, but is cropped to within 2 ft. of them with Lettuces; in addition to which there are generally three or four lines of Cabbages or Cauliflowers planted along the centre of the space. Turnips also sometimes form the inter-crop. When the Vegetable Marrows begin to grow, if the weather be dry, little basins of earth are drawn to them with a hole for the retention of water, of which they get a good supply until their foliage covers the ground, and thus prevents speedy evaporation from it. The plants begin to fruit when the vines are 3 ft. or so in length, and continue growing and fruiting until frost, drought, or mildew renders them useless. In a dull rainy season, provided it is warm, they thrive apace and fruit heavily; but in a hot and dry one they are short-lived and unprofitable. When they are growing pieces of stone or brick are sometimes placed on the advancing vines or they are pegged to the ground, to cause them to root at the joints and thus afford themselves increased means of support. No care is, however, taken of them as regards thinning the overcrowded vines; but sometimes the growers mulch the ground with litter, which not only enriches it, but preserves its moisture, prevents to some extent evaporation, and keeps the fruit clean from grit. As soon as the plants begin to bear, every fruit is gathered when it attains a marketable size, no matter whether it is sold or not, for if any be left too long it will tend to render the plant less fruitful. They are gathered three times a week, the gatherers being supplied with fruit-collecting baskets, a stick, and a knife. With the stick they turn aside the leaves of the plants in search for the Marrows, and they are thus enabled to go over the ground quickly, and without much bending of the back. When each gatherer has filled a basket, it is carried to the outside of the plantation, and emptied into a heap, or into large baskets or a waggon stationed there to receive them. The trampling the Marrows seem to undergo in the process of gathering does not appear to injure them much. In August some good fruits are selected and marked by inserting an upright peg alongside of each, and these are allowed to remain untouched till ripe, when they are cut and placed within frames or in exposed situations before the sun, so as to become thoroughly ripened. They are afterwards placed in a corner in some of the sheds, to await a convenient season for extracting and washing the seeds. After the middle of September Vegetable Marrows are commonly useless, and the demand for them diminishes; consequently they are not after that time worth the ground they occupy. Sometimes they are cleared off the ground at once, and at other times they are left until frost completely kills them; but in all cases the haulm is raked off and carted to the manure-heap before manuring or digging the ground, which is usually planted at once with Coleworts. Custard Marrows are grown out of doors on the same system as early Vegetable Marrows; but, as they are weaker growers than the latter, they are only planted about 8 ft. by 6 ft. apart. The ground is also, as a rule, mulched all over, and in the event of dry weather they get occasional good waterings.

**Insects, etc.**—Green fly and mildew are the principal enemies of the Vegetable Marrow; they only appear, however, during cold or exceedingly dry weather, when the plants are not making free and vigorous growth; therefore the only remedy is to plant in rich, moist material, and give all the protection possible from cold winds, etc.,—in fact, to do all calculated to promote free and luxuriant growth.

## Horseradish

(*Cochlearia Armoracia*).

THE HORSERADISH is indigenous to Britain, and may be grown in any soil or situation; but to grow fine straight roots—which it is unnecessary to say is the part that it is cultivated for—it requires a deep rich sandy soil, or rather it generally succeeds best in such, although there are often grand sticks produced from other soils, widely different in character. The finest Horseradish we ever saw was grown in mud thrown out from the river. On the side of the river Lea there was a large bed of Horseradish that had been growing there for a number of years, the digging of it being generally done hap-hazard, or where there was likely to be the best sticks found. When it became necessary for the river to be cleaned out, the mud was thrown over the bed of Horseradish to a depth of from 2 ft. to 3 ft. The next year, however, the Horseradish came up through the mud; and on digging we were not a little surprised to find clean, straight young sticks, from 2 ft. to 3 ft. in length, proportionate to the depth of the mud. The general mode of growing Horseradish is to trench a piece of ground 2 ft. deep, adding plenty of rotten manure, and in the spring to plant crowns, with a straight root 2 in. or 3 in. long—or in the event of not having sufficient crowns pieces of straight root 4 in. or 5 in. long may be used. The best way is to plant in rows 12 in. or 15 in. apart, the sets being 8 in. or 9 in. apart in the row. Holes may be made with a stout stick or crowbar 12 in. or 15 in. deep, and the set dropped in the hole filled up with fine light soil.

Some growers prefer a ridge similar to a Celery ridge, planting small long roots 14 in. or 15 in. long, in rows of three abreast, and as the sticks are dug for use, the ridge is made up and planted again, so that there is always a succession of good Horseradish. A correspondent of the *Garden* gives the following method of growing Horseradish, by which he claims to have produced in ten months sticks that measured from 5 in. to 8 in. in circumference. During February, take small straight pieces of the roots about the size of, or somewhat smaller than, the little finger; from these remove all the side-shoots and roots, and form them into straight sets from 8 in. to 14 in. long. Prepare a piece of ground by deeply digging and well manuring it, and plant the sets in it in rows 3 ft. apart and from 12 in. to 18 in. in the rows. The sets must be planted in a slanting position, and must not be more than 2 in. beneath the surface. The ground at all times must be kept free from weeds, and should be well watered in very dry weather. Planting the set at an angle—in fact, in nearly a horizontal position—is, no doubt, the great secret of success; for, being placed so near the surface, it has the full benefit of the sun's heat, which causes it to make rapid growth long before that which is planted according to the old method—*i.e.*, from 18 in. to 20 in. deep, and in a perpendicular position—reaches the surface. I am certain that want of success is alone to be attributed to this, and that the experience of any of your readers who may think fit to adopt my plan will be the same as my own.

Mr. Bradley, Preston Hall, grows his Horseradish by placing a common round drain-tile with it, sunk 2 in. in the ground, filling the tile with fine earth, and planting a set near the top of the tile and 10 in. above the surface. He says it is an admirable plan; digging for the product is saved, and a fine clean stem is the result.

Mr. Gilbert says that by placing leaves or litter on the tops of Horseradish crowns 2 ft. or so thick, the plants grow through them in the course of the summer, making small white roots the thickness of one's finger, which are as tender as spring Radishes, and a great step in advance of the tough stringy stuff often supplied with our roast beef.

During the winter months a supply of Horseradish should always be at hand, stored away in sheds, and covered with dry soil or sand, in the same way as Carrots, etc.

The salesmen in Covent Garden Market have a large demand for Horseradish, judging by the immense quantities of it which are imported from Holland. Huge heaps of it may be seen on market mornings about Christmas time, consisting of bundles containing from twenty to twenty-five sticks each, of first-rate quality, tied up with small but strong withies. These bundles arrive packed firmly in large barrels, and in many cases the heads are found to have made a considerable amount of growth on their way, which, of course, is blanched as white as Seakale. The sticks are not washed before being packed, but are placed in the barrels apparently as they are dug from the ground, with a quantity of soil adhering to them. It is somewhat remarkable that a crop so easily grown as Horseradish should be sufficiently remunerative to pay for importation, whilst in London market gardens comparatively little of it is grown. The reason of this may probably be that there is only a demand of any importance at certain seasons of the year, December being the principal month in which it is required. It might perhaps, therefore, scarcely do for market gardeners near London, who have to pay such high rents, to occupy a very large portion of their ground with such crops as Horseradish, that will not admit of other crops being grown amongst it, and for which the sale is somewhat uncertain. Indeed, only a few salesmen who do business with hotels and similar places can dispose of it in any quantity; and Horseradish being a root that will keep good for a considerable length of time, they can afford to import large quantities of it at a time, and by so doing buy at a much cheaper rate than would remunerate English growers.

## Leek

(*Allium Porrum*).

THE LEEK does not hold that place in English household economy to which its nutritive properties and savoury qualities so justly entitle it. In olden times the whole of the Onion tribe were held in much higher estimation as articles of diet than they are at the present day. Doubtless many have wondered why it is so pointedly recorded in Scripture history that the Israelites in the wilderness murmured at the loss of the Onions, Leeks, Garlic, Cucumbers, and Melons, of which they had been accustomed to partake as food when they were under the Egyptian yoke. Herodotus, an eminent Greek historian, relates that the large sum of 1600 talents was spent in Garlic alone for the supply of the labourers employed in building the pyramids of Egypt; and it is probable that as much, or even a larger amount, was disbursed for Leeks. The Alliaceous plants of Egypt and other eastern countries are far superior in flavour to those grown in colder latitudes—they are sweeter, milder, less pungent, and more nutritious. According to Hasselquist, the Egyptian Onion was held in general estimation on account of its various good qualities; and doubtless the same peculiarities of soil, climate, and culture that produced it in such perfection gave the Leek also its special excellence. "Whoever," he exclaims, "has tasted Onions in Egypt must allow that they are not excelled in any other part of the universe. Here they are sweet—in other countries they are nauseous and strong; here they are soft—whereas those grown in the north of Europe are hard, and their coats are so compact that they are difficult of digestion. Hence they cannot be eaten anywhere with less prejudice and more satisfaction than in Egypt."

It is well known, even in Europe, that there are Onions *and* Onions, and that those grown in Spain and Portugal are milder in flavour than those raised in England; there is also a great variation in the quality of Leeks. These two members of the same family (the Onion and the Leek) have also one characteristic in common—viz., the larger in size the milder in flavour; they differ, however, in this: that whereas the Onion flourishes best in a warm climate, Leeks are finer in size and more extensively consumed in the temperate zone; from which it may be fairly assumed that they are really superior in quality to those produced in the south of Europe; it may be stated, at least, as a fact, that Leeks are more generally grown in Scotland and Wales than in England. The Leek is the national emblem of the Welsh, of many of whom it has been reported that they fill their gardens with Leeks, with the exception of a small piece left for Garlic and Onions; while if one travel to the north of the Tweed, and through the Highlands of Scotland, the partiality of the inhabitants for Leeks and Onions will be specially manifested.

Stimulated by local shows and by the growing demand for large Leeks, the culture of these useful vegetables has arrived at great perfection in different parts of this country; in fact, they have often been grown and shown with the blanched portions as large in circumference and as long as a medium-sized head of Celery—say about 1 ft. in length and 1½ lb. in weight. Leek shows are as popular in the north of England as those of Celery and Gooseberries in the midland counties, and Grapes in the south; and the artisan or tradesman is as proud of his monster Leeks as the Grape grower is of his 26-lb. bunches of Grapes. The firm, solid, milk-white stems of this vegetable, when stewed, are much relished with roast meat, while "cock-a-leekie"—which is made by simmering a fowl and Leeks together for some hours until they are melting and tender—is a dish much esteemed in Scotland; and boiled whole in ordinary soup and served as a vegetable, or shredded down into the mass, the Leeks give a savour that neither Onions, Garlic, nor Shallots can equal; indeed, there is no reason why stewed Leeks should not be as well known on the table as mashed Turnips or boiled Carrots. All who can eat Onions may eat Leeks in greater abundance, for they are milder than the Spanish Onion, easier of digestion, and perhaps more nutritious.

**Soil.**—There are few plants that pay better for liberal treatment, or sooner resent neglect in any shape, than Leeks. The soil in which it is intended to grow them should be lighter than that in which Onions are generally cultivated, and they thrive best in alluvial deposits of rich black earth thoroughly impregnated with decomposed manure. What is known as rank manure is not at all suitable. The best mode of preparation for Leeks is to dig or trench the ground early in autumn, covering it with a heavy coating of manure, and leaving it as rough as possible during winter to mellow the surface and assist in the perfect decomposition of the manure.

**Sowing and Planting.**—About the middle of February sow the seeds either in rows at a distance of 1 ft., 1½ ft., or even 2 ft. apart (according to the richness of the soil, the mode of culture to be adopted, or the size to which the produce is expected to grow), or in a seed-bed of rich soil. The seeds should be covered with about ½ in. of soil, and the surface finished in the same way as for Onions. Sow again in March, April, and even May, for successional crops; these latter sowings should be in drills from 12 in. to 15 in. apart, and the plants should remain where sown to come in during the winter and spring months. Where a constant supply of Leeks is required successional sowings are necessary, for the first-sown will grow under liberal treatment to a large size, and are not so hardy as those of a smaller size and later growth; all that is requisite to be done is to thin them to the extent of from 6 in. to 12 in. apart in the rows, and to keep them clear from weeds throughout the summer; those sown in March might also be earthed up with about 4 in. of earth on either side of the stems before winter sets in. The success of the crop is mainly dependent upon the manner of sowing the seed, which operation should be performed thinly, whether in drills or broadcast on a seed-bed, in order that the plants may not be weakened; for thousands of plants are crippled and damaged for life by overcrowding in nursery beds and lines, which no subsequent attention can repair; consequently on the heels of thin sowing severe and prompt thinnings must follow, which thinnings may be planted in either of the ways described further on. But I will first deal with rows planted so widely apart as to be left till the Leeks have attained their full size where sown. As soon as the crop is thinned to about 1 ft. from plant to plant, hoe the ground well to clear the surface of seed weeds; within a week, draw some loose sweet earth up so as nearly to touch the Leeks on either side, and leave a small ridge 1 in. or 2 in. from the plants, which will then stand in a small drill. Hoe the level surface again, and as the Leeks grow, draw a fresh supply of fine, sweet soil to increase the size of the ridge, and so proceed throughout the season. As they develop in size of top and number of roots, sprinkle a little guano on the surface before each earthing up, and flood it occasionally with guano-water or house or yard sewage, for the Leek is a moisture-loving plant with a superabundance of roots, and should never be allowed to become dry; if the plants receive such stimulating and nourishing treatment as that just mentioned, they will make extraordinary progress. After August the earth may be drawn up quite close to the stems on either side, forming a ridge from about 1 ft. to 1½ ft. in height, which will have the effect of blanching the stems to that height, and will insure that whiteness, solidity, and mildness which are the chief recommendations of a perfect Leek.

Another mode of growing fine Leeks is to form trenches for them in the same way as for Celery, though not so wide—9 in. or 12 in. being quite sufficient. Fill each trench at the bottom with about 6 in. of well-rotted, rich, light manure; surface this with a few inches of soil, and leave the top from 6 in. to 12 in. deep. Plant the Leeks out of the seed drills or beds into the trench in dull, showery weather, taking care to preserve all their roots. This will be found a most convenient method to allow of the easy application of water and manure; see that the plants are kept clear of weeds. As they advance in growth fill in the earth a little at a time; this will refresh and stimulate the plants. By the end of the season the trench will be level with the surface or probably converted into a slight ridge on either side of the Leeks, which will be from 12 in. to 18 in. long, thoroughly blanched, and of the finest quality. Leeks are sometimes planted with a dibble in newly-dug, highly-manured ground, in the same way as Cauliflowers or Cabbage plants, and simply left to shift for themselves.

Another method of planting is that adopted for setting Potatoes with spade and line. The ground is dug and manured in the autumn, and again dug early in April. When 1 ft. or more is dug, set the line against the work and cut it down straight with the spade; then plant the Leeks carefully against the straight cut along the face of the dug ground, spreading out the roots and covering them with some of the fine soil already cut down; dig another foot of ground—taking care not to bury the Leeks too deeply—and proceed to plant another row, and so on until all are completed; by this mode the plants will have a fresh, soft, untrodden root-run in which to start, and often thrive remarkably well. The subsequent management consists in merely keeping the surface clear of weeds, and in copiously watering should the weather prove dry. This style of planting is termed "digging in."

Crowbar planting is the last mode to which there is any occasion to refer, and it is doubtless one of the best. The ground can hardly be too rich and fine for this style of planting; where it is otherwise, a huge crowbar or dibble is often used to make a hole from 18 in. to 2 ft. deep, and about 4 in. in diameter; several inches of the hole are then filled up with rotten manure or rich compost, on which the Leek plants are then dropped, and frequently left to shift for themselves without any subsequent treatment; and they mostly grow so fast that before the autumn their long blanched stems have filled the holes and hidden them and the whole ground with crowns of enormous leaves. It used to be customary to crop the leaves of Leeks at the time of planting to check evaporation, and also, as was supposed, to throw more strength into the roots and stems, while some cultivators, with the same mistaken notion of the effect, took the points of the leaves several times during the summer; but experience has since proved that the leaves and the roots must be left intact as far as is possible if the finest Leeks are to be produced. These useful vegetables are in season from September to April, though it is possible to have them earlier and later. Those sown in February will last until the end of January, and those later sown will keep well without running to seed till April or May. Many cultivators take up their Leeks in the autumn, and "heel" them in closely together, and rather deeper than previously, after the manner of Broccoli; some also cut off the roots, and store them in earth or sand, like Celery is preserved in cold climates; they are, however, apt to lose their flavour when kept long after this fashion, either in the ground or in a cool cellar. It is a common practice with those who wish to prolong the Leek season as far into the summer as possible, to lift the entire crop about the middle of March, and lay in the plants pretty closely together, without unduly crowding them, in a north border, choosing the shadiest and coolest position.

**Varieties.**—There are several kinds of Leeks—as the St. David's, Musselburgh, London Flag, Ayton Castle Giant, Large Rouen, and others—all garden selections from the original species, Allium Porrum, and perhaps A. sativum and A. lineare, either of which will develop into fine Leeks if well cultivated.

**Seed Sowing.**—No one need take the trouble to save their own Leek seed, for sufficient can be purchased for 1s. to furnish the majority of gardens. However, should a cultivator desire to have seed from his own plants, all that is requisite is to save a few of the finest—the less blanched the better—for a second year, when they will be sure to flower and ripen abundance of seeds in the autumn. The flower is of a purple colour, and the seeds when ripe are of a brown hue; they may either be thrashed out when ripe, and treated exactly like Onion seeds, or they may be left in the head, and stored, or suspended in a cool, dry place till wanted. Old Leeks, especially of the later, smaller crops, may also be made to produce useful bulbs by leaving them in the ground, and cutting off their tops nearly level with the ground early in April, when they will immediately commence to throw up fresh flower-spikes, which must be persistently pinched out as they appear; by-and-by the Leeks will give up the contest, the bases of the old leaves that were left when the plants were cut down within 1 in. or 2 in. of the ground will wither, and the old stem and roots will decay; but in the struggle for life it will be found that the old Leek has pushed out several young pseudo-bulbs, which will be found clustering closely around their dead progenitor: these bulbs produce the finest Leeks, which are far superior in quality to those raised from seed.—*D. T. F.*

***Leek Culture* in Market Gardens.**—There is an extensive demand for Leeks during the autumn and winter months. The varieties usually grown in market gardens are the London Flag, a tall thick-stemmed sort, with broad leaves, and the Musselburgh, which is not unlike it, but which has a longer neck, and, being hardier than the London Flag, is more suitable than it for the main winter crop. The first sowing, for which the London Flag is used, is made in a frame on a gentle hotbed in the last fortnight in January or first fortnight in February, or it may be delayed until a frame can be emptied of Lettuces—a crop generally grown in that way. The hotbed is made by casting out a trench, 5 ft. wide, 18 in. deep, and of any convenient length, filling it with fermenting manure, over which the frames are placed. A few inches deep of soil are put inside and levelled; the seeds are then sown thickly, and covered by sifting some soil thinly over them. The sashes are replaced and tilted up a little, both night and day, if the weather be fine; but, if windy or frosty, they are kept shut, and a mulching of litter is put over the glass, if necessary, for protection. After the seedlings have appeared, covering at night is continued, but the frames are ventilated more or less during the day, if the weather be at all favourable. Weeds are kept in check, and where the Leeks are too thick they are thinned before planting-out time has arrived, which is usually about the end of March or early in April. The first outdoor sowing is made about the middle of February, or as soon after that time as practicable, and is succeeded by another a month or six weeks later; a late sowing being made in the last week in April or in May. For Leeks, the ground is well manured, and they sometimes occupy it alone; but more frequently Lettuces are planted between the rows of Leeks. The ground having been well manured and deeply and loosely dug, lines are drawn as for Peas, about 10 in., 12 in., or 15 in. apart, and in these the Leeks are planted from 6 in. to 7 in. asunder. The first hoeing after planting fills up the small drills considerably, and the second one almost entirely closes them; thus, not only are the plants somewhat protected at first by being in the drills, but the hoeing earths them up, and causes them to have long white necks; besides, should the weather be dry at planting time, the small drills retain water better than partly-closed holes on a level surface. Between the wider rows Lettuces are planted, and are sent to market before the Leeks are fit for use. Instead of intercropping between all the rows of a plantation formed of Leeks from the latest sowing, only every alternate second or third alley is cropped. I have seen Leeks planted between Asparagus beds, lines of Beet and Parsley, and, in Mr. Dancer's grounds, between rows of Strawberries. Mr. Dancer, however, stated that want of space alone induced him to plant Leeks in such a situation, and asserts that Strawberries should never be intercropped. By the end of July or the beginning of August the produce from the first sowing is usually marketable, and it does not pay the grower to keep it on the ground longer, as, during the extra time it occupies the ground after being fit for use, a crop of Lettuces, Spinach, or Radishes might be taken from it. Leeks for market are stripped of their outside leaves, and the roots are washed, and tied up into fan-shaped bundles consisting of six or eight heads. Some of the finest examples of the middle or main sowing are usually marked (by inserting pegs alongside of them), and kept for seed-bearers. When the field is cleared, these are lifted and planted in some sheltered corner, where they are allowed to bloom and ripen their seeds.

## Lentil

### *(Ervum Lens).*

THE genus Ervum contains about twenty species of weak-stemmed annuals, with pinnate leaves generally terminating in tendrils. E. Lens grows about 1½ ft. high, and has a weak branching stem, leaves composed of from eight to twelve oblong leaflets, and pale blue flowers borne in twos or threes. The pods are nearly as broad as long, smooth, and contain one or two seeds. The Lentil was probably one of the first plants brought under cultivation by mankind for the purpose of affording food, and at the present day Lentils are still extensively cultivated throughout most parts of the East, including Egypt, Nubia, Syria, India, etc.; and likewise in most of the countries of central and southern Europe, but not to any extent in England. There are several different kinds—the most common being the French and Egyptian. The former is of an ash-grey colour, large and very flat, resembling a lens in shape: in fact, the lens derives its name from the resemblance it bears to the Lentil seed; while the latter is much smaller and rounder, with a dark skin, and of an orange-red colour inside. On the Continent, and also in India and other eastern countries, Lentils are largely employed as an article of human food, but in this country their use is not so general, although considerable quantities are annually imported. Many years ago the imports into the United Kingdom amounted to 131,892 bushels, valued at £26,379, or 4s. per bushel,– nearly the whole of which came from Egypt. Their principal use with us is for the preparation of the so-called invalids' food, which, under the names Ervalenta and Revalenta, has attained no little celebrity. These articles are nothing more than Lentil meal, sweetened with sugar or flavoured with salt. As an article of food Lentils rank first among the pulses, containing three per cent more flesh-forming or nutritive matter than the common Pea; but like many other eatable leguminous seeds, they are very indigestible when not freed from the outer skin. The Lentil is easily cultivated in England, and is worthy of attention, as being capable of yielding a supply of wholesome food. Half a pint of seed drilled in rows 1 ft. apart in March or April would not badly occupy a portion of cottagers' gardens, and the seeds, ground into meal, would make a pottage which would be of great value to the family. A kind of Lentil with yellow seeds is a favourite food with the Chinese, and may be seen now in shops which sell Chinese products.

# Lettuce

*(Lactuca sativa).*

Lettuces appear to have been in cultivation ever since the time of the ancient Greeks and Romans, without any record of their first introduction. The numerous varieties of the Lettuce have been referred by modern botanists to three supposed species (Lactuca sativa, L. capitata, and L. crispa); and, as no plants so characterised are now to be found wild in our own quarter of the globe, their origin is vaguely assigned, as usual, to East India. That country may, however, be well ransacked before Cabbage or Cos Lettuces are met with growing wild in the mountains. Their prototypes may be sought for, with much better chance of success, amongst the common wild Lactucæ of the Mediterranean region, but can only be determined with any degree of probability by a more correct knowledge of the changes produced by luxuriant cultivation.

Lettuce is one of the most important of salad crops; it is also a remunerative crop, when properly grown, inasmuch as a large quantity may be grown in little space, and being quickly off the ground, it may be grown in many vacant places that could not be profitably utilized for other crops—such as between rows of Celery, close under walls, between fruit-bushes, etc. Lettuce is mostly placed on the table whole, or at least the leaves are not cut; but it is also used cut up in Salads with other ingredients, and of late years it has been a custom to boil Lettuce in the same manner as Cabbage. In order to have a good supply of Lettuce at all seasons of the year, glass structures of some kind are indispensable. The French use cloches for Salad growing with marvellous success: one thing, however, may be borne in mind,—they have a warmer climate; although they often get very severe weather, yet the soil seldom gets so cold as in our English climate.

**Culture.**—To have Lettuces in good condition, crisp and well-blanched, all the year round, requires, in addition to the requisite means and space, a good deal of forethought. One of the greatest aids to good Lettuce culture is a deep rich soil; and it is far easier to make it deep and rich enough in the first instance than to struggle on through a hot dry summer on a poor hungry soil, harassed by the necessity for incessant watering to keep the plants from bolting. The first requisite in Lettuce culture is a well-manured, deeply-cultivated soil—all other things are, in a sense, subordinate to this—and the next is frequent sowing and planting.

**Sowing and Planting.**—Where the demand is regular and constant, a small sowing of two or three sorts once a fortnight, from March till September, will ensure a supply, and save a good deal of annoyance. The first spring sowing should be made in February, in a gentle hotbed if possible; or if the hotbed cannot be spared, then a box or two may be sown and placed near the glass anywhere, to be gradually hardened off and finally planted out in April. It will succeed the last sowing made in September; and very frequently the finest Lettuces of the season will be produced from this February sowing. Towards the end of June and through July, sow on the north side of a wall, and thin the plants out according to the size of the kinds grown: 8 in. apart will be sufficient for Tom Thumb Cabbage Lettuce, whilst the larger kinds of Cos and Cabbage will require 10 in. or 1 ft. Sow in drills, as it gives facilities for frequently stirring the soil with the hoe. The thinnings may be planted elsewhere; but if the season be hot and dry, those not transplanted will probably be most satisfactory.

**Mulching and Watering.**—When hot dry weather sets in, mulch with rotten dung, if possible, between the rows, laying it nearly up to the plants. A very great thickness will not be necessary; 2 in. or 3 in. at the most will be sufficient. This mulching saves a deal of labour in watering in a dry summer. In fact, without mulching, on some soils watering is worse than useless; it encourages, during the time the effect of the water remains, the production of fibres near the surface, and if the water be neglected for even a short time these fibres perish. Far better will it be on hot soils, if mulching cannot be resorted to, to deepen the soil in every possible way, keep the surface loose by frequent hoeing, and discard the waterpot altogether, unless a regular and constant supply can be given. But when the plants are mulched, a watering once a week or so washes the soluble portions of the manure down to the roots, and pushes on the plants rapidly. The last autumn sowing should be made about the middle of September, on a warm south border, to stand in the seed-bed over the winter, as it frequently happens small plants survive a severe winter when large ones perish.

**Winter Lettuce.**—Lettuces required for late autumn or winter salads, when nearly full-grown, are very easily injured by frost. There are many ways of protecting them, and perhaps the best is to lift them carefully with balls, and plant them under frames. Lettuces can easily be forced, and where good winter salads are in request and ample means allowed for their production, there is not the slightest difficulty about it; in fact, there is no reason why some of the skill and energy devoted to forcing early Potatoes, Carrots, etc., should not be diverted to Lettuces, which are good subjects for forcing, and will repay any care bestowed upon them. It seems generally admitted that the French can beat us in the production of early Lettuces; but they have a better climate, and, in addition, they have the sense to grow their winter and early spring Lettuces under glass. We have a wide field open for improvement in our Lettuce culture. Yet good Lettuces may be had from early sowings made in heat afterwards transplanted to another bed under glass; and the value of a crop of Lettuces is equal, if not superior, to the same space occupied with Potatoes. Mr. Hobday remarks, "When I had to furnish winter Salads largely, I had a four-light pit that had two 3-in. hot-water pipes along the front. This pit, with others, was filled with leaves, and was used for forwarding early Strawberries, and afterwards it came in for various uses during the summer. Early in October the bed of leaves was turned out, and, if dry, watered, made firm again by treading, and about 10 in. of good soil placed on the top, which brought up the surface to within 15 in. or 18 in. of the glass. The soil was allowed a few days to settle, and the pit was then planted with the most suitable sorts of Lettuces. There was a very gentle bottom heat, and the pipes could be used when necessary. The growth of the Lettuces was always rapid and clean, and beautifully crisp and white when tied up for a short time. In our cold, wet, foggy climate, Lettuces under glass in winter are sometimes attacked by mildew; but where there is command of the least amount of artificial heat to keep the air in motion and dispel damp, there is not much trouble from mildew."

The following is Mr. Simpson's plan :—"For the earliest winter Lettuce I always prepare a frame early in September. I use no bottom heat in the way of leaves or anything else; there is still enough of sun and warmth to promote a luxuriant growth, with the occasional assistance of glass, to produce fine plump Lettuce by the beginning of winter that will keep for a long while in a standstill but excellent condition, in a dry frame. Prepare a bed of good light rich soil in the frame, such as refuse potting-soil, or anything of that kind. Let the surface of the bed be within 1 ft. of the glass, and when ready plant with young plants of Hardy Green or Hammersmith; and for first use, Paris White Cos. If there is likely to be a scarcity outdoors in late autumn, place 4 in. apart and the same distance between the rows, and use every alternate row first, and afterwards every alternate plant in the rows left. This leaves the main crop of plants 8 in. apart each way, which will be sufficient for their development. They will require watering and other attentions till they are full grown. This will be in November, or early in December; and, after this, the object ought to be to keep the plants—not to grow them. To do this the frame should be kept dry and cool, by lifting off the lights in favourable weather and putting them on in wet weather. Only keep all still and dry, and a well-filled frame of compact Lettuces will be the reward. A plan, only second to this, is to lift full-grown plants from the open ground in October or November with balls, and set them together in a dry shed, filling up the spaces between the balls with rather dry soil. They will keep a long time this way."

**Blanching.**—This process is probably the most vital point in Lettuce culture; for badly-blanched Lettuce, no matter how fine it may be in other respects, is wanting in crispness, flavour, and general appearance. There are now so many kinds of Lettuces which naturally turn in and blanch themselves, that these will, in all probability, give greater satisfaction to most people. Where, however, those kinds are grown that do not naturally turn in, tying must be resorted to. This operation should at all times be performed on dry days, for if tied up whilst the leaves are wet, losses from rot will be the result. Tying should be done when the plants *have nearly* attained their full dimensions; and two ties to a plant are better than one, if time can be spared for it. If, however, Lettuce is wanted before it has time to grow into proper size, it must be tied up at least a week previous to use.

**Varieties.**—Varieties of Lettuce, like most other vegetables, are grown under so many different names that it is almost impossible to know the true name of any of them. Perhaps, to answer all purposes, there is no Lettuce to equal the Black-seed Brown Cos, whose chief faults are its wanting tying up in order to have it properly blanched, and that it is of a brown colour. If, however, it is well tied, the inner leaves may be had of a pure white with purple rib.

Among the varieties of Cos Lettuce we may mention Alexandra White, which grows to an immense size, crisp and fine-flavoured. The Paris White and Green Cos are too well known to need much comment; and, as every one knows, for summer use there are few to equal them, blanching themselves in the most perfect manner, and thus doing away with the tedious task of tying. Williams's Victoria, too, is a fine dwarf kind, and excellent for winter use. To these may be added Hardy Winter White, London White, Moorpark, Alma, Nuneham Park, and Brockett Hall.

The best kinds of Cabbage Lettuce are probably Hammersmith Hardy for winter, and All the Year Round for summer; the old Neapolitan, however, still wants beating. Wheeler's Tom Thumb, Lee's Hardy Green, and White Dutch are also good kinds.

Commodore Nutt is a Cabbage Lettuce of the All the Year Round type; but it proved to be still dwarfer than that variety. It is nearly all heart, does not run to seed so soon as some of the larger kinds, and is a great acquisition, owing to its taking up so little room in beds or rows. Sutton's Gem is another Cabbage Lettuce of a large size, and one which forms good hearts, which are crisp and well-flavoured.

Mr. A. Dean, writing on varieties of Lettuce, remarks that, after careful trials of many sorts of Cos and Cabbage Lettuces, for several years, it has been proved that most of the so-called new kinds of White Cos are, after all, but mere selections from the old Paris White Cos. The two best strains are White's Alexandra and Dimmick's Victoria,—the first being exceedingly even, true, and slow to run to seed. The latter also inherits most of these qualities, but it is specially to be commended for its great size and usefulness for exhibition. Of winter Cos Lettuces the largest and best are Acme White Cos, a very fine hardy variety, and Sugarloaf Brown Cos, a strain of the Black-seeded Bath Cos. Neither of these require tying, and they are without exception first-rate. Among Cabbage Lettuces, the best in my opinion is Leyden White Dutch for the very earliest. If sown with the summer White Cos kinds, it will be ready for cutting a fortnight before them. And with it also sow Victoria Cabbage Lettuce, a fine solid kind, but several days later, and one which stands well. For winter work sow in the end of July and beginning of August Stanstead Park Brown Cabbage Lettuce, the finest grown, and with it Fearnought Cabbage Lettuce, which is much like the last, but stands longer. Than these no better selection can be made.

Mr. Lumsden, of Bloxholm Hall, recommends Stanstead Park Cabbage Lettuce for winter and early spring. He finds it very hardy, forming good hearts; and by using protectors it can be had all the winter, until the Black-seeded Brown Cos comes into use, early in the spring. The protectors he uses are of home construction, and are well adapted for the purposes to which they are applied. They can be made by any carpenter, and are neat in appearance. They consist of 1 in. deal boards, the back boards being 11 in. and the front boards 9 in. deep. These are fastened together by cross-pieces, and are grooved near the upper edge in order to secure the loose squares of glass which slide in from the ends and form a roof. The frames are about 1 ft. wide; and 6-ft. lengths are found to be most convenient for moving from one place to another. Such frames are most useful for protecting Lettuces, as well as Peas, Radishes, and early Potatoes.

**In Market Gardens.**—This is a very remunerative crop to the market growers, and is generally used as a catch crop. For market purposes the Bath Cos is almost the only variety cultivated, either for winter or for summer use. Growers for market are, however, fully aware that the variety of the White Paris Cos, generally known as the London Cos, is the best summer Lettuce in cultivation, owing to its adaptability for being transplanted, its reluctance to "run," its excellent quality and fine colour; but about Bath no kind sells so readily as the Brown Cos. No wonder, then, that it has obtained the name of Bath Cos. It is an excellent Lettuce, however, and the best Cos that we have got for standing the winter; and if bound round with a withe or piece of matting when nearly fit for use, it forms a large fine heart of beautiful white crisp leaves, with pinkish midribs. The sowings between August and December are made on beds, and the young plants are transplanted where they are to remain; but the spring and summer sowings are made where the plants are to stand till they are fit for use, in rows from 16 in. to 18 in. apart, and the seedlings are thinned out in the row to 1 ft. asunder. In this way, and by a careful selection of seed, the plants seldom "run," and are had in use throughout the whole summer; and the fields in June, when the produce is fit for use, present a uniformity and freedom from seeding plants not exceeded in the greener-leaved sorts. As a summer Lettuce it is, however, rather unaccommodating, inasmuch as it cannot be safely transplanted when necessary, and used as a catch-crop, in the same way as is done with the Green Cos Lettuces.

In some market gardens banks are thrown up on which to grow Lettuce, and some of the tender Cabbage kinds stand the winter with impunity. In open places, especially where the soil is wet, it is usual to round up beds on which both Cabbage and Cos Lettuces are planted, as in this way less moisture is retained around the roots than when they are planted in flat ground. Lettuce banks have a sharp incline, without special reference to aspect—the important point being to secure shelter. In order to obtain this the banks are thrown up under Apple trees, Currant bushes, etc.; and in some cases small Laurels are planted closely along the tops of the ridges, and in such a manner as to project over the bank. These Laurels afford good protection, as they retain their foliage all through the winter. Under such circumstances, a Lettuce crop is got off early, and the soil can be again partially levelled to furnish a crop of dwarf Beans, or other summer produce. The best market Lettuces appear to be the Paris White Cos, Bath Brown Cos, and Grand Admiral Cabbage; and in some cases the Leyden White Dutch Cabbage kind has also given great satisfaction. Of course a hardy constitution is of the first importance; but the bank plan of culture is advantageous to half-tender kinds, that are larger and more acceptable for table. The demand for Lettuces depends for popularity very much upon the character of the weather; in cold periods they are little sought after, but in warm weather there is a great demand for them.

**Packing Lettuce.**—The delicate Cabbage Lettuces sent throughout the winter to our markets from the market gardens of Paris are sometimes objectionable, from the fine earth of the roots spreading over the Lettuce leaves. This necessitates the Lettuce being washed, which, to many, is objectionable. The Cos Lettuce, however, which comes in early spring in great quantities, is frequently packed with paper, and in this way arrives without being soiled by the root-earth.

## Maize or Indian Corn

*(Zea Mays).*

THIS, now so widely spread over the south of Europe, does not appear to have been introduced from America till nearly a century after the discovery of that continent, though mentioned as a valuable article of trade in the West Indies by several travellers in the sixteenth century; it is shown to have been still unknown in Spain at the close of that period, and it was not until after the year 1610 that it found its way through Spain and Sicily into Italy. Professor Targioni-Tozzetti satisfactorily shows that all supposed mention of this grain by earlier writers before the discovery of America referred to other kinds of grain, though under some of the names since given to the Maize.

Mr. William Cobbett, when travelling in the United States, sent home some cobs of the Indian Corn or Maize, so abundant in that country; and it was at that time thought probable that it might be used as a substitute for Potato. Many bought seed of it, and grew it: invariably the crops failed to ripen properly, and much disappointment followed. The present Mr. William Cobbett has discontinued growing that kind of Corn, but he is said to still entertain the belief that there is a kind of Indian Corn or Maize that would ripen here under ordinary culture, and he believes he is now in possession of a stock of a variety which may probably answer his expectations,—he having recently cultivated and harvested a good crop with the best results. This was grown in ordinary garden soil, prepared by digging and manuring as for any ordinary garden crop, and with after-cultivation of the simplest kind. The best way to grow it appears to be to have the soil thrown up into ridges, of which the width apart depends on the method of after-cultivation to be adopted—whether by hand or by the plough. In the States it is the practice to cultivate it in hills 4 ft. apart each way, thus leaving, whilst the plant is yet young, ample space to work the plough amongst them for earthing up. Mr. Cobbett, although his crop was cultivated by hand labour, grew it in rows 4 ft. apart; but equally as good a crop could probably have been produced at 30 in. between the rows, as that would give ample space for earth to be drawn to the roots by hand-labour. If the crop be grown largely, and the plough be required to cultivate the soil between the rows, not less than 4 ft. space should be allowed from row to row; and after the earthing up is performed, a row of Swede or White Turnips might be sown in each intermediate space, and thus the ground would be utilised to the fullest extent. To prepare for the reception of the seed-corn the soil should be thrown into ridges, and then be slightly flattened with a light roller; the seed is then dibbled into the centre of each ridge in holes about 4 in. apart and 3 in. in depth. It soon germinates, and, as it throws up a shoot that is sweet and tender like that of a Pea, it is eagerly sought for by birds, which will attack it vigorously unless they be kept at a safe distance; as soon, however, as it is well through the ground, it is safe. The course of treatment required during growth is simple enough: if in a small patch, a good flat hoeing, followed, when the plants are 12 in. in height, by a good earthing-up. Grown in good soil, the new Cobbett's Corn does not exceed 4 ft. in height, and it is far from being so coarse-growing a variety as we have hitherto been familiar with. It is one of the peculiar features of the Maize crop that it can be harvested at any time, as, whilst still standing, it suffers neither from frost nor rain. Each cob is furnished by Nature with an external leafy covering that effectually protects the Corn from moisture. The covering is of a stout fibry texture, and, as the weather becomes moist it contracts itself closely around the Corn, and keeps it quite dry; still, should it get at times a little damp, it soon dries again when fair weather ensues, so that no harm is done. Probably, at no time could Maize be better harvested than in dry frosty weather; but the question of harvesting would be, of necessity, a question of convenience. A stalk will produce from four to six cobs, the finest being at the bottom. A good cob contains about 240 corns, which, when ripe, are of a rich golden-yellow hue. As a rule, the best cobs grown by Mr. Cobbett had eight rows of Corn, thirty in a row, laid together in the most perfect order; and, although much finer cobs may be grown, certainly none could be more handsome. To preserve them clean and bright for a considerable period, it is desirable to strip off the outer leafage, leaving only the inner one; and, if this be tied round at the top of the cob, it will keep it fresh and clean for a long time. It appears to be the rule to pull the cobs whilst the straw is standing, after which it is cut close to the ground and carted away. The straw is useful as a winter covering, as, owing to its stout fibry texture, it does not decay so speedily as ordinary straw. One characteristic which should not be overlooked is that the plant throws up suckers from its base. These are not fruitful, and should be cut clean away before the final earthing-up is given—otherwise the crop will suffer. The uses to which this Corn may be put are many and various, and it is one of the most nutritious of all articles of diet; it is evident that, if successfully cultivated in this country, its proving a profitable article of culture must mainly depend upon its mode of manufacture. There are machines for "dis-cobing" the corn; and any mill that would grind Peas or Wheat should also as effectually grind it. The corn is with us largely used as food for poultry and for horses, both whole and in a crushed state; it enters largely into the composition of bread, as is evidenced when the bread crumbles instead of being cut clean by the knife. The flour of this Corn forms a delicious diet for infants and for invalids; it makes puddings and blancmange, and, in the hands of a clever housewife, will make us sweet crisp cakes. Whether or not it will prove a paying crop depends mainly on the cost of cultivation.—*A. D.*

## Morel

(*Morchella esculenta*).

THIS is an edible fungus resembling the Mushroom, and is found in quantity in many parts of Germany; and in some parts of England it may be found, but it has never until lately been subjected to cultivation, or found and brought to market in any very large quantities. It grows wild in the woods—chiefly in Pine woods—preferring a sandy soil. As far as the writer is aware, the first person to attempt its systematic production was M. Laurent Geslin, a farmer and landed proprietor at Bourg-la-Reine, in the north of France. Being a great lover of the esculent, it occurred to him to ascertain by trial whether it could not be grown in beds like the Mushroom. He commenced by making the beds as follows: Two-fifths dry stable manure, two-fifths ordinary light soil and road-scrapings, and one-fifth wood-ash, sowing in the same some Morel spawn—a fibrous, web-like substance, which had been collected for the purpose. This first attempt at domestication, or rather artificial culture, turned out, however, very unsatisfactorily. The beds, which it should be mentioned had been laid in a dark cellar, were overrun with a fungus of another kind, and of his much-loved Morels M. Geslin obtained but five specimens. Fortunately, ill success, instead of discouraging him, only had the effect of inducing him to repeat his experiment with certain modifications; and in the end he was amply repaid for his pains and perseverance. The chief alteration he made was to reduce the quantity of manure in the beds by one-half, and to put in its place the same amount of soil taken from a spot where the Morels grew wild. The result of this change was a produce of 13 tons 6 cwt., equivalent to 6½ lb. to the square yard. For several successive seasons the beds, without being re-sown, continued to yield very remunerative crops, and not until 1871—three or four years after their formation—did any signs of exhaustion show themselves. The commencement of April is the usual time for the beds to begin bearing, and the gathering lasts uninterruptedly until the middle of July. On account of its finer aroma, M. Geslin cultivates the small brown Morel (Morchella esculenta) in preference to the larger grey variety. As in the case of Mushroom-growing, it is desirable to exclude, to a considerable extent, light and air, and to keep the beds constantly moist. The water required for the last-named purpose is, at Bourg-la-Reine, conducted by a gradual incline on to a wattle hurdle (placed over the bed), and allowed to trickle through. To facilitate its escape afterwards, and prevent the soil becoming over-saturated or caking, the beds have a layer of Willow branches placed beneath them. Morels may be quickly and satisfactorily dried without losing any of their aroma; the plan M. Geslin adopts is to attach them by their stalks to a string, and hang them up in rows in a granary or other airy place. In this way they may be preserved until the new crop makes its appearance, or, if the grower prefer to keep them, still longer. Should he wish to dispose of them, they will fetch at any time in the market a price which well repays him for the time and labour bestowed on their cultivation.

From recent observations of Messrs. Lorenz and Schollmayr, in Germany, it would appear that in tan—the spent bark, etc., of the tanyard—we have a valuable material for promoting the growth of this highly-prized edible Fungus. Mr. Lorenz, head-gardener at Bunzlau, in Silesia, gives the following as his experience with it:—A short time since he had occasion to make a hotbed for wintering Roses, Verbenas, etc., the lower lining of it 14 in. to 15 in. in depth, consisting of leaves of the Lime tree; the upper one 9½ in. thick, of tanners' spent bark (Fir mixed with a little Oak bark). Over the two linings was spread a thin covering of the same kind of leaves, and upon this came the frame. Into the beds thus formed the pots were plunged up to the rim; and, according to the state of the weather, the frame was either shaded and protected against the frost, or so arranged as to admit light and air. Owing to this careful management, the plants looked healthy and well in the following spring, when the time arrived for removing them. On taking up some of the pots at the end of March, however, great was Mr. Lorenz's surprise to find the soil in them, and the whole of the tan in the bed, overrun with a network of fibres and threads resembling Mushroom spawn; nor was his astonishment less, a month or six weeks later, on seeing spring up in his pots a fine crop of Morels. Unfortunately, instead of leaving the bed and pots undisturbed, as he would have done had he been able to foretell the upshot of this fibrous network spread over them, he removed the tan in order to form another bed; and in the latter not a trace of a Morel was to be seen. As the fungus is frequently met with in the neighbourhood of Bunzlau, some spores of the same had doubtless found their way into the tan of the original hotbed, and thus been placed under circumstances favourable for their development. No opportunity occurred to Mr. Lorenz to make, on the strength of the above experience, a regular trial of tan as a stimulant to the growth of the Morel; but the results obtained by Mr. Schollmayr, director of an experimental farm at Laibach in Carniola, afford strong additional evidence of its efficacy. That gentleman, with a view to check the ravages of the masses of snails and slugs which, year after year, destroyed the buds put forth by young seedling fruit trees in his nursery, covered the ground in the autumn of one year and the spring of the next with spent tan, 1 ft. deep, chiefly consisting of Fir bark and Gall-nut meal. The application of this strong-smelling material had the desired effect. For a twelvemonth or more the ground was freed from snails, and the young trees grew vigorously. Another, and quite unexpected result, however—and it is this alone which interests us here, as corroborative of Mr. Lorenz's experience with tan—was the appearance in great quantities of fine delicately-flavoured Morels; these shooting up most abundantly wherever the top-dressing was thickest and consisted of bigger pieces of bark. The staple soil of the nursery, it should be mentioned, was a poorish sand; and Mr. Schollmayr observed the curious fact that in those spots which—consequent on the heads of the trees being here and there closer together—were more shaded than the rest, the Morel was replaced by another fungus (Phallus impudicus). As Mr. Schollmayr's nursery was dug over several times after the Morels ceased to appear the year above alluded to, he had no means of judging how long his dressing of tan might have effected their growth. He does not doubt, however, that if the application were renewed annually, and a suitable situation selected, the cultivator would be rewarded with a plentiful crop. In expressing this opinion he pre-supposes, of course, the existence of a sufficient supply of spores.—*T. S.*

## Mushroom

(*Agaricus campestris*).

THIS is indigenous to Great Britain, and indeed almost all parts of the globe. It is considered to be one of the most delicate and highly appreciated vegetable dishes in cultivation. The French grow Mushrooms to a considerable extent in caves and caverns, and the supply they are enabled to send to London as well as Paris markets is something enormous. There are now few establishments of any extent where a Mushroom house of some kind is not to be found, and where a Mushroom house proper is not available, there is generally some contrivance by which a few dishes may be secured during the spring and early summer.

Although the Mushroom may in many instances be grown with little care or attention, yet, as a rule, it may be safely said that few crops are really more uncertain—at least, this is the case where outdoor or ordinary open-shed cultivation is carried on; and, indeed, we may often see elaborately-built houses, prepared in the most skilful manner possible, fail to produce, with any amount of certainty, crops of Mushrooms when they are wanted. Much, however, depends upon the spawn: if good spawn be procured, kept from excessive cold or damp, and introduced at a proper time, fair results may generally be relied upon. There are many methods of Mushroom culture; therefore we give several, supplied to us by some of our most successful cultivators.

Some forty years ago a pamphlet appeared—at the present day very rare—which is often attributed to Baron Vander Linden d'Hoogvorst, and which contains such sound practical matter relating to Mushroom culture that we have thought a translation of it might be of service to our readers:—"The culture of the Mushroom, so often described, has seldom been accomplished successfully by those who have undertaken it. Chance alone has made it succeed in certain cases; and I am one of those who have found that, for two or three years, a crop was secured, which the following year failed, although the measures used were, in all respects, the same as those first adopted. After observations extending over a series of years, I think that I can safely attribute this difference to three causes—to damp, drought, or bad spawn. It was remarked, long ago, that, in years when little rain falls in May and June, but few Mushrooms are found in the fields during the following September, because the spawn which forms during that season, and of which a portion remains over from the preceding year, cannot be developed, and is thus wasted. Keeping these observations in view, I only water my beds four weeks after they are made, and then only when I see at the surface the tips of the Mushrooms, or the small threads that indicate the presence of spawn. To prevent the soil, which should be damp, from forming too hard a crust, I cover the beds with hay or aftermath, thrown on lightly. I have also used with success, for this purpose, old carpets—always, however, putting a little aftermath below them. This covering has the double effect of preventing the bed from becoming too dry, and of preventing the propagation of insects (especially the wood-louse) that are partial to Mushrooms. Drought is much less dangerous to the beds, for the evil may easily be remedied by watering, which must also be done sparingly; it is ordinarily only necessary to damp the aftermath with water off which the chill has been taken,—for cold water, applied when the bed is hot, does great harm. As regards dormant spawn, dryness, and, to a greater extent, dampness, prevents its running. Everything proves the necessity of having good spawn.

"**Making Spawn.**—Spawn may be made in a covered and dry, but not too airy, situation. The corner of a barn, or that of an outhouse or shed, or even of a stable, is a favourable place for its development. The bed in which it is to be generated should be made early in May, and the following are the materials employed, which may be reduced to smaller proportions if necessary:—Fifty-six barrow-loads of fresh horse-manure, six barrow-loads of good garden soil, and one barrow-load of fresh wood-ashes which have not been wet, with half a barrow-load of pigeons' manure fresh from the pigeon-house; double the quantity of the latter must be used if it be of the preceding year. The whole should be watered lightly with cow's urine or water from the manure-heap. When the mixture has been properly made, after various turnings it should be placed to the depth of 1 ft. along a wall; the width may be left out of the question, but it requires a certain bulk in order that it may heat gently. The bed must be trodden down firmly, and, at the end of ten days, the consolidating process must be repeated, and ought to be continued two or three times a week until early in September. The manure, thus prepared, is cut with a sharp spade into squares of about 1 ft. each. These are then left to dry in a granary, or any other airy place from which sunshine and, above all, damp are excluded. These bricks are placed on their sides, and turned from time to time. Spawn thus made will keep good from ten to twelve years, if placed in a dry position, free from frost. Sometimes, even in the granary in which the spawn is dried, large quantities of Mushrooms may be gathered; they spring up amidst the débris accumulated along the wall, and even in the crannies between the boards of the floor. Another way of making spawn, but less certain than that just recorded, inasmuch as it is not so easy to find a convenient place for its manufacture, is as follows:—Against an eastern wall I make a hole a yard in depth, and a yard and a half square, and fill it with rich manure, mixed with a little dry cow-manure. After having settled it well with the feet, I make holes through the material to the bottom with a pointed stick of the thickness of a large cane. These holes are then filled with wheaten bran, with which I have previously mixed a pinch of sal ammoniac for each hole. I again make the whole firm, cover with a piece of old carpet, and plank it over to throw off rain. At the end of six weeks, all the manure thus prepared will be found filled with spawn, equally as good as that previously described; but it is more difficult to preserve, as it cannot be formed into bricks, as in the former case.

"**Dry Cow Manure and Salts of Nitre in Mushroom Beds.**—I do not wish it to be inferred that it is impossible to procure Mushrooms without cow-manure and without salts of nitre; on the contrary, I believe that, up to the present time, neither of these ingredients have been employed, except by me or by those to whom I have explained my method. In the summer of 1829 I had some cow-manure collected, intending to use it as compost for Pine-apples the following spring; but, on examining it, I was astonished to find it filled with spawn. Therefore I left a portion of this cow-manure near a wall with a southern aspect, covered it with 1 in. of good soil, and a month afterwards—*i.e.*, towards the end of May

—I gathered from it a large quantity of Mushrooms. After this, therefore, I had all cow-manure in my fields gathered as fast as it dried; and, to prevent the premature development of spawn in it, I took care to keep it in a dry granary without letting it touch the wall. As the cow-manure of which I am speaking was collected in fields in which Mushrooms grew naturally, I thought that the spawn which it contained might have been obtained from the soil, but experiments made the following year proved me to have been wrong; for, of three heaps collected from different fields, one—from a field covered with long Grass, where there never had been any Mushrooms—furnished as much spawn as the other two.

"**Salts of Nitre.**—I have found salts of nitre to answer well in Mushroom beds, causing them to produce abundantly, and earlier by eight or ten days than beds to which none was applied. My practice is, before placing the cow-manure upon the beds, to water it freely with water in which nitre is dissolved, allowing about 2 oz. of nitre for every 4 square feet of surface. As regards Mushroom beds, I may mention that light does them harm, even moonlight, inasmuch as far fewer Mushrooms are found in open fields after a clear night than after a dark one. Further, the practice of using manure that has just come from stables or from a large manure-heap should be avoided; for, in addition to its throwing off a vapour that is injurious, the spawn gets burnt. The manure, to be used after rejecting the most strawy part, should be thrown into conical heaps in the shade, each heap containing about two barrow-loads, and turned occasionally for about ten days in summer and six in winter. When at a proper temperature the bed should be made up at once, covered with cow-manure, spawned and soiled.

"**Mushroom Beds in Dry Cellars or Similar Places.**—Most people know how to make these beds; I, therefore, confine myself to pointing out what must be avoided if success be desired. The beds must not be exposed to a current of air, and great attention must be paid to the character of the flooring or pavement. If the latter be unfavourable, the thickness of the beds must be increased; and, in order to economise the manure, a thick layer of old tan may be put under it; new tan, however, is the best, or wood Moss passed through an oven, in order to destroy all insects and their eggs. Moss, indeed, may be used under all kinds of beds where damp is to be feared. These two materials may be used for either raised or sunk beds, but above them there should be, in every case, at least 1 ft. in thickness of short stable manure, well trampled down. This should then be covered with 2 in. or 3 in. of cow-manure, watered with salts of nitre in the manner already described. If these instructions be strictly followed, and the temperature of the place be sufficiently warm and dry, Mushrooms will make their appearance some thirty days after the beds have been spawned, but always in a shorter space of time in summer than in winter. Such beds may be placed in the middle of a cellar, on each side of which a gently sloping bed should be made, and, in the middle, a flat bed, round which should run a path for the service of the three beds.

This flat bed is a very desirable one, inasmuch as it has generally a larger surface than that of raised beds, and, consequently, produces more Mushrooms. The dimensions of this bed will, of course, vary according to circumstances; but when it is desirable to have it raised it is necessary, in order to economise manure as well as to prevent its giving off too much heat, to make a centre ridge of earth or spent manure from Melon or other beds, or, what is better still, spent tan. When this base, so to speak, is thoroughly consolidated, it is covered with 12 in. of horse-manure beaten firmly, and from 2 in. to 3 in. of cow-manure damped with nitre water, as previously explained. The whole having been well pressed down with the back of a spade, the spawn should be introduced in the following manner:—Holes should be made with the fingers to the depth of 2 in., and about 7 in. apart; but closer if you have plenty of spawn. Into these the latter should be inserted in pieces about the size of a Hazel nut; and the holes should then be at once stopped up with earth, as the spawn develops itself better than if it were merely contained in the cow-manure. When the whole bed has been spawned, it is covered with quite 1 in. of soil, flattened and smoothed with a spade; and some aftermath or hay should then be thrown over it to prevent its drying too quickly. The bed should then be left in this state for three or four weeks; and, if it have been made with care and suitably placed, small Mushrooms should be developed in from twenty-eight to thirty-one days after spawning; sometimes before, if the temperature be uniform. It should be understood that a cellar where Mushroom beds are to be made should be sheltered from cold and damp; good cellars, however, are often too cold in summer, and thus are unfit for the growth of Mushrooms. This applies equally to raised and sunken beds; both should have but 1 ft. thick of manure before being consolidated. If the manure be found to be too warm, it will be necessary to wait a day or two before the bed is spawned.

"**Mushroom Beds in Hothouses.**—It is easy, when constructing a hothouse, for whatever purpose, to make the paths which run round it hollow chambers, 15 in. or 16 in. deep, in which Mushrooms may be grown. In attending to the latter, all that is necessary is to turn back the flooring of the pathway against one of the sides, when the bed, which should be covered with aftermath, is reached. My houses having been constructed before I had any idea of cultivating Mushrooms, the paths were not hollowed out; but, being sufficiently raised, I was enabled to remedy the defect by placing one or two steps at the entrance. This method succeeded well with me in Pine-stoves and Peach-houses, in which, at the same time, I cultivated French Beans and Vines, although during a great part of the winter the temperature was comparatively low. When the house is warm, tepid water should be copiously and frequently applied. In hothouses there are usually to be found numerous out-of-the-way places, especially in the case of forcing-houses, which may be usefully filled with boxes, which, on account of their small size, are of easy transport. In the case of hothouses, a foundation of from 4 in. to 5 in. of short stable manure is better than anything else; and, in addition, in order to be certain of an abundant return, time must be given to the spawn to develop itself before it is placed in so warm a position; four weeks will be sufficient, and during this interval the bricks should be placed one upon the other in a cellar, where it is neither too cold nor too dry.

"**Mushrooms in Dwelling-houses.**—An experience extending over two years has enabled me to grow Mushrooms in places in which it might be thought they could never be produced. I constructed drawers of deal, which fitted into spaces beneath flower-stands in rooms; and with little trouble, and without any unpleasant odour, I have been enabled to gather Mushrooms all through the winter. Under these circumstances I only use dried cow-manure to the depth of 7 in., without any other manure, and I prepare it in the following manner:—After having thoroughly damped it with nitre and water in the proportion mentioned on page 191, I press it down with my feet to the thickness of about 4 in., mixing with it, as it is put into position, a little earth thrown on by hand. The spawn is then put in, without pressing it down too much, with a compost of earth and cow-manure, to the depth of 2 in. Out of ten beds that I made in drawers this year, the greater number showed Mushrooms at the end of six weeks—one only being two months. This one was, however, in the coldest situation. I should recommend the drawers intended for use inside a house being prepared two or three months beforehand, so that time may be given for the spawn to "run." I have proved that Mushrooms can thus be grown under staircases, or even in kitchens; but air must not be altogether excluded from the drawers. After these beds have finished yielding, care should be taken to collect the spawn which they contain, as it will be found valuable for making new beds.

"**Mushroom Beds in Stables.**—The most suitable place for Mushroom beds is undoubtedly in stables, where the gentle, equable and vaporous heat contributes much to the development of the spawn. Want of space is the obstacle most frequently encountered; but, by exercising a little ingenuity, few stables will be found in which several series of beds, about 2 ft. wide, cannot be constructed. The shelves on which they are to be made should be 26 in. apart; a board, 10 in. wide, should be nailed along the edge, leaving a space of 16 in. to admit of watering and otherwise attending to the beds. The "bunk" thus formed should be filled with loose manure to the depth of 6 in., and 3 in. of cow-manure, damped with nitre and water; 1 in. of earth should then be laid on the top. A curtain of thick linen, working easily upon an iron rod, forms a door for the aperture; and in this way it is possible to have six Mushroom beds in a height of 14 ft., 2 ft. being the width—their horizontal length, of course, depending on the extent of wall.

"**Open-air Beds.**—The position which I chose for my outdoor beds had an eastern aspect, partially covered by a projecting balcony. My bed was made on the 1st of May, and I took the precaution of using manure to the depth of 2½ ft. instead of 1 ft. The bed was 4 ft. wide by 22 ft. in length. This bed did not bear until the 15th of June, and it was not until after August that it produced Mushrooms in abundance, which it then did up to December. Since then, excellent Mushrooms have been gathered twice a week, although we are now in February. During the whole of the summer this bed was covered with aftermath, old pieces of cloth being placed over all. In December I use a mulching of stable-manure, put over the cloth.

"**Remarks.**—I may add that a Mushroom bed depends much upon the preparation of the manure before placing it in position. In the first place, an oblong heap, at least 3 ft. high, should be formed; this should be beaten down with the back of a fork, taking care to mix the long and the short manure together. It is left in this state for a few days; then it is turned, and what has been at the sides or on the top is placed in the centre. If the weather be very hot, or if much rain fall, the heap should be covered with planks, to preserve it from too much heat or damp. After turning it, and allowing it to remain for ten or twelve days, it may be made up into a bed, and spawn introduced when the heat is suitable for that purpose. Experience has also taught me that successive crops are seldom obtained in the same place. I have in vain attempted to discover the cause of this singular fact. Last year I tried an experiment with a bed entirely new in form; only at Vienna had I ever seen anything resembling it, and I admit that I borrowed the idea from what I there saw. To avoid the results of always making beds in the same cellar, I dug a ditch in the ground, in a dry and shady situation; roofed and thatched it with straw, and in winter covered it with dry leaves, 1 ft. deep. It yielded plentifully, beginning in November and continuing on till the middle of April, and even after that time. I made a similar bed elsewhere, and it produced an enormous quantity of Mushrooms throughout the summer. This vault should have a very small door at one of its extremities to serve as an entrance. In placing the manure in the middle, in the form of a sunk trench, 6 in. should be left on each side as a "gangway." The manure should not be raised above the level of the soil, upon the edges of which should be placed, at equal distances, pieces of wood which cross the bed transversely, and which serve to support a plank, upon which a man may walk in gathering the Mushrooms. The little door should consist of straw, and should be closed with care. From such Mushroom vaults daylight should be carefully excluded, as it withers and destroys the small Mushrooms. The covering may be made with green-cut withies, which are attached to the joints that carry the plank. It is only necessary to cover it with straw to throw off water. This covering should be made flat, so as not to render a large quantity of straw necessary, and to admit of its remaining there without trouble. One more species of Mushroom bed remains to be described, but I have no practical acquaintance with it myself. A most respectable person, in whom I can place the utmost confidence, assured me that it proved very successful with him. It consists in drying, in a granary, horse-droppings, when a sufficient quantity can be obtained. When they are thoroughly dry, these are formed into one large heap, and damped with nitre and water. The heap is pressed firm, and, when well fermented, which will be at the end of ten days or a fortnight, it is laid to a depth of 4 in. or 5 in. in beds where Melons, Carrots, or other vegetables are grown. Earth, to the depth of 4 in., is placed on the top, and the Mushrooms spring up amidst the other vegetables. This bed, I am told, lasts a long time ; but of course it is necessary to use spawn, as in other cases."

Mr. James Barnes, formerly of Bicton Gardens, gives us the following :—" Where I lived some years ago there was a Mushroom house, heated by a flue and peat fire. The shelves were placed one above another for the reception of the material for the beds ; cow-manure was collected from the fields, horse-droppings were shaken out, turned and dried in open sheds ; the beds were made, rammed tight, and spawned in due course ; the whole was then covered with nice friable loam to the depth of 2 in. or thereabouts. This system was called "Oldacre's method." At that time it was considered a great feat among horticulturists to grow Mushrooms successfully ; and I well recollect earnestly watching for them to spring up—which they did, very nicely, in about six weeks. Three years later I entered a large London market garden, where Mushrooms were largely grown, on pretty much the same principle as that just mentioned, only, instead of shelves, the beds were made on the floor against the back walls of sheds, along which flues ran, or in beds ridged in the centre, according to convenience. In winter a fairly moist heat was maintained by placing hot stable manure inside, and often turning it over. In summer beds were similarly made in an underground cellar, and out-of-doors ridge beds. Indeed, we were at that time considered first-class Mushroom cultivators, of whom there were very few about London, so that a good price was always obtained for our Mushrooms. My employer would never sell them under 1s. per pottle (that is, a Strawberry pottle) for the buttons, and a small flat punnet for the open or flat Mushrooms. At that time Mushrooms paid better made into ketchup than when sold at 1s. a pottle. I have known them sold in quantities at that time from 2s. 6d. to 7s. 6d. per pottle, and, when very scarce, even at half a guinea a pottle. I next undertook the management of a much more extensive market garden, on the Surrey side of London, where Pines, Grapes, Cucumbers, Melons, Salads, vegetables, etc., were forced very early and extensively ; Mushrooms had, however, not then been attempted at that place. I soon set about growing them, however, on a very extensive scale, and also the manufacture of spawn. I had now so simplified the Oldacre system that any one could grow Mushrooms who could get a little stable manure and some fresh earth ; good loamy holding or stiff soil certainly is best.

" How I first got this knowledge was as follows :—I was removin an old worn-out bed in dry weather, in the summer time, when I observed how the spawn had run into the earth, as well as into the muck or litter that had been wasted and trodden about near the beds. I at once asked myself, Why take so much pains and trouble in preparing and drying the manure to make Mushroom beds?

"So I set about making fresh beds directly with stable manure, shaking out only a small portion of the longest dry litter, and intermixing with it a quantity of such earth as was at hand, ramming and treading it down as firmly as possible to the desired size and depth or height. In this way I at once secured the full properties of the manure and soil, and a genial heat, without a chance of burning or becoming too moist, or in the least exhausting the properties of the material through fermentation. Such a composition, in a genial situation, will oftentimes actually breed or produce spawn without using artificial spawn. Beds made on this principle always produce Mushrooms in abundance, of the finest and heaviest kind, and continue to bear or produce them for many months. After the beds have been in bearing for some time and are beginning to get dry, we always water with tepid clear manure-water, made or formed only from sheep, deer, or cow-manure; no chimney soot or lime is used for this purpose. It is astonishing the length of time a Mushroom bed may be kept in full bearing by this treatment. For the last thirty years I have made my beds entirely on the floor in sheds; I wheel in the stable-manure fresh, and mix with it a sufficient quantity of soil, incorporating all well together, treading and ramming it firmly down, letting it remain five or six days; then shake it up and intermix it well together, and if it be found fermenting too strongly, I add more soil, treading and ramming down as before. Very soon afterwards it is ready to spawn and case with soil; when, a very gentle genial heat and moisture being secured, these properties are afterwards fully maintained. In this way much trouble and time are saved in collecting cow-manure and in getting the horse-droppings saved, as was wont to be done. Besides, in the frequent turnings to which the manure used to be subjected, its best properties were allowed to escape. In winter we make our beds, when finished and cased, about 16 in. or 18 in. thick, and in summer about 6 in. less, thus securing Mushrooms every day in the year."

The following remarks are by Mr. Simpson, of Wortley:—"It is often thought the culture of the Mushroom only begins when the bed is spawned; and practically speaking it does, perhaps, but success depends upon circumstances considerably anterior to that. The preservation of the spawn has much to do with it. If kept too cold it may be dead, and if kept too warm and moist, it may have become too far developed for cultural purposes. Well-preserved fertile bricks are permeated with a thin, whitish-looking mould, and smell strongly of Mushrooms. If the spawn be distinctly *thready*-looking it has gone too far, but it need not be discarded on *that account, though* it is unlikely to produce such good crops. *Nurserymen should* always be prepared to send their bricks out in a perfectly dry and good condition; but, whether owing to bad storage or not, they are too often quite moist, containing spawn in an active state. I should not like to subject Mushroom spawn to a lower temperature than 40° for any length of time, but would not venture to assign the limit in the ascending scale so long as the bricks were kept dry. That it may be safely subjected to a temperature of 90° or 100°, and kept for years under such circumstances, we can testify from our own experience, and prefer such spawn to new for several reasons, but principally because it produces Mushrooms sooner and of better quality, and at the same time a more abundant crop. Our constant rule is to use the oldest spawn first, and, as it is stored above a flue close to the furnace, it is always as dry and as hard as it can be. That old spawn so preserved is better than new, has long been the opinion of many good Mushroom growers; and it is certain it can be preserved only in a dry state, for if the bricks be moist a high temperature only causes the spawn to run into the thread-like stage, when it becomes useless.

"**Chief Points in Mushroom-house Culture.**—These are summed up under three heads—viz., preparation of the fermenting material or stable litter; temperature; and watering. As regards the first, some cultivators are very particular, and will have nothing but the pure horse-droppings; and the saving of these free from straw and litter is part of the daily work of one man in many gardens. Such work is, however, entirely needless. In fact, a bed composed of horse-manure alone is worse to get into good condition than any other, owing to the violence of the fermentation and the difficulty in getting the material as sweet and dry as it should be. Of all materials for Mushroom bed making nothing is so convenient, and nothing works off so readily as stable litter, long and short, taken just as it comes. The droppings alone, if they get wet before they can be procured, require much attention before they are fit for use; but if mixed with the straw as it comes from the stable there is no difficulty. A few turnings suffice to bring the material into good condition, and the bed is ready for the spawn in a much shorter time. Of course the manure should be prepared under cover, in a cool shed, or some such place; and it should be turned frequently, say once a week, till the heat is just bearable by the hand, and till it is tolerably chaffy but still moist. A wet bed will never produce a good crop, if it produce anything at all. The manure should be just moist enough to heat, and yet so dry as partly to defy treading or beating with the mallets in making up the beds; this is the most favourable condition for inducing the quick run of the spawn, and in such a case the sooner the bed is spawned the better, provided the temperature be low enough. I am thus far particular in trying to convey my meaning perfectly on this point, for many fail in preparing their Mushroom beds. Next, as to the temperature of the bed, I may just state that the kind of structure used as a Mushroom-house has much to do with it. Cellars or caverns are the best places of all, being little affected by the external temperature; but any structure will do in which the temperature can be maintained steadily at about 55°; it may be allowed to go as high as 60° or as low as 50°, but these figures represent the limit. In a high temperature the Mushrooms are long-legged and of poor substance, and the bed soon gives over bearing; while, if the temperature be too low they come on very slowly, and often go off as fast as they came. If we could by any means keep our beds at 75° for a month after they were spawned, we should not be anxious about spawning till the beds had subsided to that figure; but as the temperature goes down every day after the final treading till it has reached that of the house or thereabouts, the growth of the Mushroom is materially interfered with, for the spawn will not run readily or well in a lower temperature than 75°. I have tested this point over and over again, and always with the same result—viz., a very slow crop, or no crop at all. Endeavour, therefore, to get the spawn dibbled in 4 in. deep at least, as soon as the bottom-heat thermometer records 85°, being sure the temperature is on the decline. Afterwards cover the bed thickly with hay or straw to prevent loss of heat, and in about a fortnight later, as a rule, the spawn will be running freely in the bed, and a crop of Mushrooms is then a certainty, if no accident occur. If the spawn have run well, the time to give water is of some importance: a good drenching judiciously given will sometimes bring the Mushrooms through a week or ten days sooner than they would have come. Not a drop of water should be given for three weeks at least after spawning; but if it be then seen that the bed is pretty well run with spawn of a thready texture, and particularly if on the surface of the bed, here and there in the form of embryo Mushrooms, a good watering may be given with water of the same temperature as the bed, and the dose may be repeated three or four times within a week or ten days. This will bring the crop through in quantity, after which water must be given only when it is required to keep the bed tolerably moist.

"**Mushrooms without Artificial Spawn.**—It is not always necessary to use artificially-prepared spawn in Mushroom culture, as natural spawn is often procurable in great quantities in old stable litter-heaps and places where it is germinated spontaneously, so to speak. I have often had chance crops from such a source. On one occasion a lot of loose stable litter, which had been laid up in a heap for a month or two, and which was afterwards dug into the ground for the Broccoli crop, produced in September and October quite an abundant crop. On another occasion a pit which was filled up with nothing but the dry straw from the stable yard—the droppings having been previously shaken out of it—and soiled and cropped with Potatoes, produced one of the most enormous crops of Mushrooms I ever saw. They came in clusters as large as peck measures, and continued to come for three months. This was in the month of May, some few years ago, and the straw had been put into the pit in the month of August previous. Spawn of this kind is usually of the very best description, and it is often to be found in litter produced by well-fed horses, if it have been allowed to lie for a while. Usually it is in the dry flaky portions of litter that it is most abundant. They are white and mouldy, like a Mushroom cake, and smell even more strongly of Mushrooms. These flakes may be gathered and stored in the same way as the bricks."

A correspondent in the *Garden* writes thus :—" Although Mushroom culture is well known, and has been often well described, there are some things still to be said, and those more especially in the direction of economical culture. Any person who can procure stable-manure, good loam, good spawn, prepares them properly, and has a snug warm spot to make the bed in, can grow Mushrooms ; but there are those who have not these conveniences, and yet Mushrooms may be grown, and that too at a small outlay of either trouble or expense. The great and indispensable desideratum is fermenting material of a kind that will retain a gentle heat for a very lengthened period, and for that purpose some materials may be used which have not recently been named—if at all. First among these may be mentioned sawdust, which has been used for bedding horses, or for riding-school tracks. Such a substance, thoroughly impregnated with urine, and mixed with horse-droppings, forms an excellent material for Mushroom beds, especially if mixed with one-fourth of good fibrous loam. These mixed and fermented together, and thrown into a bed 1 ft. to 18 in. in thickness, according to the temperature of the shed in which the bed is made, will be found to form capital material for growing Mushrooms, especially as it retains the heat for a long time. The worst of it is that the material is almost valueless after it has served the first purpose; and used as manure upon light land is rather injurious than otherwise. Then you may use leaves and loam in the proportion of one part of the latter in a turfy state to four or five of fermenting leaves. These may be recently gathered from the trees, and should be allowed to attain a brisk heat before the loam is added ; and then, after sweating for a week or ten days, may be turned, mixing the materials thoroughly together, after which they may be formed into a bed.

A Mushroom bed of this kind should not be less than 15 in. in thickness when thoroughly consolidated ; and, so managed, it will grow Mushrooms just as well as manure. Droppings from our streets and cattle markets, especially if paved and much frequented by horses, or from cab stands, etc., if collected when dry and fermented a little, yield capital material for beds. From the cattle market we have the manure of horses, sheep, and cows mixed together in a finely divided state, the heating of which is gentle and regular. Material of this kind procured on dry days from the sanitary authorities, thrown together to ferment a time or two, and then made into well consolidated beds, will produce Mushrooms of the finest quality, and continue in bearing a long time. It is of the first importance that this material be collected in a dry state, as the slush of our streets would not do at all. Equal proportions of street sweepings from those parts of towns most frequented by horses, and fresh leaves properly fermented and mixed with loam, would make perhaps as good material for the growth of Mushrooms as need be obtained. The beds, properly made and consolidated, must, if the heat be too violent, be immediately pierced with holes by a broad, blunt stick, say 1 ft. apart, so as to let the superfluous heat escape; and when it has done so fill up the holes again and spawn the beds. The temperature of the manure or bed at the time of spawning should not exceed 80°: indeed, 75° to 80° is the proper temperature. At the time of spawning it is a very good plan to cool the beds with an inch or so of good loam, thoroughly beaten down. This is preferable to waiting until the spawn begins to spread, as at that time the check of the cold soil will throw it back for a considerable period, if not destroy its vegetative powers altogether. The right time for the final earthing of the beds is when the spawn is nicely spreading, which may be told by the white filmy appearance of the surface. The soil, if possible, should be warm at the time of using, and it will at the same time be well to cover the beds with a dry mat or two, until the surface soil attains the proper temperature.

Twelve months ago I made a Mushroom bed upon a vinery floor, the manure being roughly prepared and not very dry at the time of its formation. However, it was formed and allowed to heat, and then a coat 3 in. thick of strong loam from a Melon frame was forked in and made solid, and a few days afterwards the bed was spawned. I never had Mushrooms do better; they were large in size, and very fleshy, and the beds continued in bearing until June. Upon the continuous bearing qualities of a Mushroom bed a word may be said. It may savour of the ridiculous to say that a plant growing upon a manure-bed may fail from the want of manure; yet such is literally and positively a fact. When beds become worn out, and the produce small and spindly, some persons directly do away with them and make fresh ones. Instead of doing this, give the bed a thorough soaking of stable urine and water at the temperature of 80°, using the urine in the proportion of one part to five of soft water, and adding a wineglassful of salt to each quantity; then coat the bed with fresh soil, cover it with mats, so as to promote the heating, and a second crop as good as the first may be obtained. In this matter I speak from experience; and Mr. Ingram, at Belvoir, has followed the same plan for many years with the most satisfactory results. Mushrooms when in a growing state require greater supplies of water than most cultivators allow, and the produce will be much improved thereby. For the purpose of growing Mushrooms of the finest quality it will be well to cover the beds with double mats, the under one of which may be sprinkled morning and evening with tepid water, and then be covered with the dry mat. This maintains a proper growing temperature around the young plants, in consequence of which they come up juicy and of particularly rich flavour. Mushrooms may be grown almost anywhere, providing the proper temperature of the bed can be maintained. Consequently the material of the bed must be such as will maintain a slow process of fermentation for a long time; and this attained, success in the cultivation of Mushrooms becomes tolerably certain.

Any one in the possession of an outhouse or cellar, and who can command a temperature of from 47° to 50°, can at any time produce a good supply of Mushrooms. Procure (fresh from the stable) as much short manure as is necessary to make a bed from 14 in. to 18 in. deep, and any size the house can conveniently hold; throw the manure in a heap for a few days until it becomes heated, and the greater part of the moisture is thrown off; then spread it out for a day or two until it is dry and quite cool; after that put it again in a heap, and allow it to remain five or six days; it will then be fit to make a bed, which must not be deeper than the measurements just given. The bed requires to be beaten or trodden so as to make it firm, and thus secure a more lasting heat and prevent the temperature from rising too high at first; as soon as the heat has risen and come down to about 74°, the bed is ready to receive the spawn,—half a bushel will spawn a bed 8f t. to 10 ft. square; it requires to be broken into small pieces about the size of a large Walnut and placed in the manure; the bed should then be covered about 2 in. deep with good garden soil, and well beaten down at the time when the spawn is put into the bed A covering of hay or straw, if put on, and carefully taken off when the Mushrooms appear, will materially hasten their growth. If the above directions be carefully attended to, Mushrooms will begin to appear in about six weeks. After the bed has been spawned, it should on no account be watered unless when very dry: a small quantity of water only, the same temperature as that of the bed, to be given at a time. The walls and floor of the house may be damped in order to maintain a moist temperature.

**Mushroom Culture in Cellars.**—Mushrooms may be, and often are, grown to perfection in many less ambitious structures than the Mushroom-house properly so called. Any kind of outhouse, in fact, will answer for the growth of autumn and early winter Mushrooms. One of the best crops which I have ever seen was grown in a cellar at West Hill House, Highgate. Of the appearance of the beds in this instance some idea may be formed when I state that from one 12 ft. long and 8 ft. wide were gathered as many as 160 lb. of Mushrooms between October and February. Other beds were also equally productive, though all of them were without the means of being warmed artificially. They merely occupied a dry dark cellar under the dwelling-house, where no hot-water pipes or other mode of heating was employed. Yet, with the thermometer down as low as 40°, they remained unharmed. The usual temperature, however, ranged from 48° to 55°. The beds were formed of short manure from the stables, 16 in. or so in depth. Previous to using the manure it was thrown into a heap to heat and get rid of its superfluous steam and moisture; it was then spread out for a day or two to dry and cool; after that it w-thrown together again for a few days more, and then it was made up into a bed. In forming the latter, however, care was taken to have it made very firm by means of treading or beating, and as soon as the heat had risen to the proper point it was spawned with Mill-track spawn, of which half a bushel is sufficient for a bed 10 ft. square. This, broken into pieces about the size of small Apples, will, placed just in the manure, and firmly covered 2 in. deep with any good garden soil, produce Mushrooms of first-rate quality in six weeks in a temperature of 50°. Beds thus treated never fail to bear satisfactorily, not only in regard to quantity but size, many of the specimens weighing 4 oz. each, and being excellent in flavour. It will thus be seen that this plan of growing Mushrooms in cellars is worthy of imitation; especially in places—and there are many—where there is no proper Mushroom-house; and even where there is, empty cellars might thus be turned to profitable account.

Mr. George Cooper, Nurseries, Derby, thus describes in the *Garden* his mode of cultivating Mushrooms:—"In growing the Mushrooms I have a profitable object in view—namely, to get a quantity of good frames in which to grow thousands of plants. I get a quantity of turves all cut about 12 in. by 18 in. and 3 in. thick. I then use the rule and line, and form a ground-plan of what is termed a cool pit for plants; these turves are placed one on the other till the required height is reached—say 2 ft. back wall, and 1 ft. front wall—the ends to slope from back to front, which will be a nice pitch for the frame; then I get my woodwork frame—just the wall plates and a few rafters across from back to front—then the lights to fit, which makes the frame complete. Every turf is placed the grass downwards, except the top one, which should be placed the grass upwards, and when nicely clipped, gives the whole a light and cheerful appearance. In building these pits I place in every layer of turves a quantity of Mushroom spawn, in pieces about the size of a hen's egg, 9 in. apart in the rows, and 3 in. from the inside edge of the frame; the heat of the sun upon the glass will give in the pit a nice moist atmosphere, and cause the Mushroom spawn to spread and produce quantities of Mushrooms from the turf walls. I cut Mushrooms as late as November last year, and I commenced cutting from the same pits a month ago. A pit neatly and properly built will last eight or ten years, and produce Mushrooms every season quite eight months out of twelve. I have four large pits over 100 feet long, now to be seen at my nursery, Rose Hill, Derby, with thousands of bedding and other plants in the same pits. These turf pits are cool and moist in summer for plants, and being nearly a foot thick of turf sods, are much warmer for them in winter than brickwork. When a new pit is nicely made and cut round with a turf edging knife, and the top grass cut nicely round, it looks better and more pleasing to the eye than bricks and mortar.

*In dry positions* and in loamy soils Mushrooms may be grown *with advantage in* open situations on lawns. The spawn should be inserted as follows :—Take a sharp spade and force it into the ground 2 in. or 3 in., withdrawing it without disturbing the grass; then place it at one end of and at right angles with the first incision, and force it into the soil in a similar manner, bending the handle backwards until an opening is made sufficiently large to admit a piece of spawn about an inch square. When this is inserted the spade should be withdrawn, the turf allowed to fall in its place and be firmly trodden down with the foot: the latter is an important part of the operation.

The months of July and August are suitable for performing this operation; the pieces of spawn may be inserted about 3 ft. apart. In soils and situations which are naturally wet this plan would not be successful. When the spawn is found abundantly in an old Mushroom bed, or runs freely through an old heap of stable manure, is the time to secure it for the purpose; or it may be bought in the usual way in the brick form, and broken into suitable-sized pieces, as mentioned above.

**Making Spawn.**—As this is one of the most important points in Mushroom culture, we give the method practised for many years with marvellous results, by Mr. J. Burton, when gardener to the Marquis of Salisbury at Hatfield :—

Mushroom spawn should, if possible, be made early in the spring, as by so doing a sufficient quantity of cow-manure—which is the principal ingredient employed—can be collected together from the cowsheds before the cows have any green food, as the manure is much stiffer and answers the purpose better than when Grass is their principal food. This should be laid in an open shed to dry, and moved every few days to prevent it heating; to this should be added in equal proportions fresh horse-droppings, a little loam, and some chopped hay or straw. The whole should be well worked together and then trodden down, after which it may be allowed to remain for a few days, when it will require to be turned two or three times a week. If the weather be fine and dry the mass will soon be in a fit condition for moulding into bricks,—which process can be performed by using a mould in the same way as the brickmakers; or it may be done in a more simple manner—viz., the manure should be spread to a thickness of 6 in. and then be firmly trodden and beaten down evenly with the back of the spade. It should then be lined out to the required size of the bricks, and be cut with a sharp spade or turfing iron. In a few days the bricks will be sufficiently dry to handle, when they should be set up edgeways to dry thoroughly, and if exposed to the sun for two or three days they will be ready to receive the spawn. In introducing the spawn, two holes should be cut in each brick at equal distances; the holes should be of such size as to admit a piece of spawn as large as a pigeon's egg. This should be well beaten in and the surface made even with a little manure. When the process of spawning is completed, the bricks should be collected together in a heap and covered with enough short manure to cause a gentle heat, being careful that there is no rank heat or steam to kill the spawn.

must be carefully attended to until such time as the spawn is found to have penetrated through the whole of the bricks, after which they should be stacked away in any convenient dry place. The spawn in the first place is generally procured from nurserymen, but it can be gathered from meadows where there are cattle tracks: it may easily be discovered by breaking up some of the soil having the appearance of a white mould and smelling exactly like Mushrooms. This will retain its vegetative powers for years, providing it be kept dry. It is advisable at times to procure a change of spawn, as this, like most other vegetables, gets worn out in time.

Another excellent Mushroom grower gives the following:—

"Six barrow-loads of cow-manure, two barrow-loads of horse-droppings, and one of loam, are mixed and beaten well together. This may be done on the floor of an open shed, and when firm the mass may be made into cakes 8 in. square; these should be placed on edge to dry in an airy shed, and should be frequently turned. Of course the bricks must be protected from rain. When half dry make a hole 2 in. square in the side of each brick, and place in it some good old spawn, inserting it so deep as to be a little below the surface. Cover up the hole with a little of the compost of which the bricks are made. When the bricks are nearly dry place them on end in a dry shed, piling them one on the other with spaces between them. Cover them over with hot manure, keeping it on for three weeks or a month; the temperature should not, however, exceed 60° or 65° Fahr. If the manure show signs of heating the bricks too much, the covering must be reduced so as to reduce the temperature. The spawn will soon begin to run through the bricks, and when it appears at the surface in the form of a white mould, they should be removed and allowed to finish drying in order to arrest its growth till it is required for use."

Mr. Simpson remarks:—"The best spawn I ever used was some that had been kept above a warm and dry place for two years or more. It became as hard as a board, and had to be broken up with a hammer when wanted for spawning the beds. I find, also, that spawn kept in this way produces Mushrooms sooner than under ordinary circumstances. I have seen the Mushrooms up in four weeks from the date of spawning, and have gathered plants in six weeks—about the period, it is generally supposed, that spawn requires to run. Many Mushroom growers make a mistake in spawning their beds at too low a temperature—say at 75°. This temperature will do, but a temperature of 85° is perfectly safe, will cause the spawn to run sooner, and will give quicker returns."

**How Market-Gardeners manage Mushrooms.**—Most people are acquainted with the mode of growing Mushrooms in sheds, cellars, tunnels, or in regular Mushroom-houses; but it is astonishing how few, even among gardeners, know anything about the way in which Mushrooms are grown for market. Between the end of September and April immense quantities of Mushrooms are disposed of, three times a week, in Covent Garden, all of which are grown in the open air. Mushroom growing is, however, a somewhat uncertain matter in bad seasons; but, under favourable circumstances, if the ridges on which they are grown be in good order, they form one of the most remunerative crops. Mushrooms for market are all grown on ridges of manure, moulded over as in the case of indoor beds, and covered with a layer of loose litter, which is generally all the protection they get. They are built so as to form a series of successive ridges from 20 ft. to 100 yds. in length, and 8 ft. apart from the centre of the one to the middle of the next. An open sheltered position is the most favourable for them, but they are also often made along the intervals between rows of fruit trees, where they do remarkably well. The manure used for making them is ordinary stable-manure, from which the most strawy portion has been shaken out with a fork and laid aside for covering the beds when completed or for other purposes, and turned once or twice so as to sweeten it and prevent it as much as possible from heating; for the fresher it is when used the more dependence there is on it. When the manure has been prepared the ground is selected, levelled, and cleared of all other crops. It is then lined off into breadths 6 ft. apart, with a space of 2 ft. between them, lines being drawn with a hoe, and wooden pegs, from 2 ft. to 3 ft. long, inserted firmly in these lines a few feet apart, to mark the place after the hoe-lines have been obliterated by trampling and wheeling barrows across them. The manure, being now moderately short, sweet, and fresh, is carted alongside the selected piece of ground, if it has not been previously prepared there, and some men are set to wheel it along the rows, whilst others build it very firmly into ridges with forks. It is the 2-ft.-wide space that forms the basis of the ridges, which are made at first about 2 ft. high, or a little more, and bluntly tapered towards the top. They are then left exposed for some days before being spawned, so that the heat may subside to about 80°, which is readily determined by sticks inserted in the litter being drawn out and felt with the hand. If the heat get strong, the ridges are immediately turned down, so as to form two out of the one, in order to cool the manure and prevent a violent fermentation. This is no uncommon occurrence, for we frequently see whole fields in August and September so overturned after having been put right. Now the use of the pegs is more than ever apparent, for they prove infallible guides, without any additional trouble, in lining off for the reconstruction of the ridges. When the heat has subsided to a proper temperature the beds are spawned on both sides. Market gardeners formerly made their own spawn, but now they find that they can purchase it much cheaper than they can make it, consequently they buy their spawn. They break the cakes up into pieces from 2 in. to 3 in. square, and these are inserted in three rows along each side, placing them pigeon-hole fashion, and from 9 in. to 12 in. apart in the rows. After being spawned, a layer about 3 in. in depth of mould is placed over the manure, and made very firm thereon by means of beating with the back of the spade; indeed, the ridges are commonly now watered through a water-pot rose, and again beate very firmly and the surface left smooth and even. All is now left alone for a few more days, when, if the inside be not likely to get too hot, a loose covering of litter is applied over them, and increased in thickness a short time afterwards. This completes the ridges, which usually come into bearing about eight or ten weeks after being spawned. The first ridges are made about the end of July and beginning of August, and the main series in the latter part of August and in September, whilst some are made as late as October. It is not altogether to form a succession that the ridges are made at intervals, but because it would be a difficult matter to get sufficient fresh manure to make many beds at one time, nor could the labour be conveniently spared all at once. Moderately dry and frosty winters are very beneficial to the Mushroom crop, and dull and damp weather is equally detrimental; hence the great risk they incur. Mr. Steel, of Fulham Fields, informs us that he once knew a most successful Mushroom grower to lose as much as £500 in one season, owing to the failure of the crop by reason of bad weather. Some years the growers do not nearly clear their expenses, the spawn becoming rotten and the ridges barren in consequence of continuous rains. In hard frosty weather additional covering is applied; and, to guard against wet, the beds are covered with mats firmly pegged down on each side—which precaution also answers the purpose of keeping the litter and other protecting material in its place. Notwithstanding all these precautions, however, the wet often finds its way to the interior and acts with deadly effect upon the spawn. Even before the beds are spawned, and afterwards, and before being moulded over, mats are used to exclude wet. We never yet knew outdoor beds to be artificially watered except at moulding time, nor yet have we seen them in a bearing condition at midsummer. In gathering the Mushrooms the rank litter is carefully removed by one man, and after him some others with baskets in which the Mushrooms are put; and following the pickers is another man replacing the covering, for it is an important point not to permit the ridges to become much exposed at any time. After April, or the first week of May, they are seldom any good, consequently they are then uncovered and entirely removed, to be spread on some piece of ground about to be dug over, or carted into one solid heap to await such an opportunity of being committed to the soil. This manure being thoroughly decayed, is in excellent condition for feeding gross and quick-growing plants, such as Vegetable Marrows, Tomatoes, Lettuces, Cauliflowers, Celery, or French Beans, and is much relished by them. Mr. George Steel, however, instead of removing his Mushroom beds as soon as they become exhausted, uncovers them and plants his earliest Tomatoes on either side of them, and, as they advance in growth, he pegs them to the ridges. As this is a warmer place for Tomatoes than the open border, Mr. Steel generally gets ripe fruit from them a week earlier than he does from any other plants in his extensive range of garden ground.

*Mr. Dancer, of Chiswick*, grows Mushrooms in ordinary frames, and sometimes with extraordinary results. In autumn, winter, or spring, the Mushrooms do well grown in this way, but in the summer time they do not repay the trouble and cost incurred in producing them ; for, Mr. Dancer informs us, they come up small, scantily, and irregularly, and no sooner do they appear above the surface than they turn bad, no matter how carefully tended. His mode of culture is as follows :—Good fresh litter is selected, laid in a heap, and turned, to sweeten and ameliorate it. A trench is then cast out as for a Cucumber bed, 5 ft. wide and 2 ft. deep, and this is filled with the prepared manure, which, after it has subsided to a proper temperature and wooden frames placed thereon, is spawned, and afterwards earthed over with 2 in. deep of mould. The sashes being thus put in position, are covered over with two or three folds of mats or a 4-in. thick layer of litter, held in its place by means of boards laid across it. In these frames, so darkened, the Mushrooms appear in two months or less, and continue in good bearing for the next three or four months. And Mr. Dancer has been known to take, from one plot of these frames, including four large sashes, four half-sieves of Mushrooms in one week. These beds, instead of having the fermenting material buried in a trench, are built above ground, precisely in the same manner as common hotbeds, and but slightly shaded by the neighbouring fruit trees.

## Good King Henry, or English Mercury

(*Chenopodium Bonus Henricus*).

THIS is, in many parts of England, Scotland, and Ireland, a rather common roadside weed, with a thick fleshy root like that of a Dock, and grows to a considerable height. The lower leaves resemble those of Spinach, and are of a broadly triangular shape, often more than 3 in. long, stalked, sinuate or slightly toothed, rather thick and fleshy, and of a dark-green colour. The upper ones are smaller and nearly sessile. It is extensively grown by the Lincolnshire farmers, almost every garden having its bed, which, if placed in a warm corner and well manured, yields an abundant supply of delicious vegetables a fortnight or three weeks before the Asparagus comes in, and for some weeks afterwards. From a south border cutting generally commences early in April, and continues until the end of June. Some people say they like it better than Asparagus ; but we cannot go that length. When properly grown, the young shoots should be almost as thick as the little finger, and, in gathering, it should be cut under the ground something the same as Asparagus. In preparing it for use, if the outer skin or bark have become tough, strip it off from the bottom upwards, and then wash and tie it in bunches like Asparagus. It is best boiled in plenty of water, with a handful of salt added. When tender, strain and serve simply, or upon a toast. Some have melted butter with it, others eat it simply with the gravy of the meat. In cultivation, the Mercury will grow anywhere ; but, to have it in the best form, superior cultivation is necessary. To this end you cannot have the ground too deep nor too rich. Hence we should say, trench ground 2 ft. deep, mixing in an abundance of rich manure, and plant as early in the spring as possible. As the plant is a perennial, it is necessary to get an abundant yield of shoots, and to get them as strong as possible—and hence, in time, each plant may be 1 ft. or more in diameter. In planting, put the rows 18 in. apart, and the plants 1 ft. apart in the row; and, after beginning to cut, drench the ground frequently with manure-water, or sprinkle the ground with guano in showery weather. Of course the plants must not be cut too severely until they are thoroughly established—say in the third year—and then you can scarcely injure them.

## Mustard

(*Sinapis nigra*).

THIS and its varieties are natives of Britain, and of the south of Europe. When grown for salads it is necessary to make frequent sowings, as it should be cut and used in a very young state, even before the first rough leaf has appeared. The seed should be sown thickly, in light soil, the surface of which should be made very smooth. The seed should be pressed into the soil with the back of a clean spade, and should then be watered through the fine rose of a watering-pot, without having any soil placed upon it; but the bed should be covered for a few days with a piece of cloth or a mat; and in the course of six or eight days (more or less, according to the season) the Mustard will be fit for use, and should be cut close to the surface of the soil with a sharp knife, and no soil having been placed over the seeds, it will be found clean and free from grit.

**Curled Cress** is a kindred plant to the above, and is generally used in connexion with it. It belongs to the same Order, and, being also used in a very young state, requires in all respects the same treatment. These make excellent salads during the winter months, as the seed can be sown in pans, boxes, or beds in any warm house, and be ready for use in a few days from the time of sowing.

## Nasturtium

(*Tropæolum majus*).

THIS plant is said to be a native of Peru. It is largely cultivated in many parts of this country for ornament, and for its pods, which are used in pickles in the same way as Capers. The leaves and young shoots are occasionally used in salads. The seed should be sown in March or April, in drills from 2 ft. to 3 ft. apart, and when the plants are up they should be thinned out to 1 ft. or 18 in. apart. A light rich soil and a light warm situation is best suited to them, although they will grow more or less in almost any soil or place. The only culture they require is to be kept well watered during dry weather, the shoots thinned, and trained over Pea-sticks or a fence; or they may be allowed to run along the ground at will, in which case it is advisable to keep the points of the shoots constantly picked out in order to keep them within bounds. The pods are gathered for pickling when in their young green state, and for seed when thoroughly ripe and dry.

## Onion

### (*Allium Cepa*).

THE exact place from which the Onion was first introduced has not been ascertained. It is, however, supposed to be a native of some parts of Africa.

The Onion represents one of the most useful of vegetables, and is largely grown in nearly every country. In England it is to be found in every garden where vegetables are grown, however limited the ground may be. Our English markets are chiefly supplied from Spain during the summer months, but during the winter English-grown Onions are being hawked about the streets in large quantities; they are generally tied in strings for sale. In many of the midland counties Onions are cultivated to an enormous extent, and at Birmingham there is held annually a large Onion fair.

Fairs, it is predicted, will soon cease to exist; but the Birmingham Onion Fair has a genuine *raison d'être*, which will ensure it a prolonged, and, in many respects, prosperous existence. Had Potatoes been as ancient an introduction to the British Isles as Onions, we should assuredly have had Potato fairs all over the country; but Potatoes were a late introduction, after the main causes for the establishment of fairs had disappeared. Onions, on the contrary, are of the greatest antiquity among pot-herbs, as a strong and savoury zest to the food of the poor, and even of the rich. The plant had been well known at a very early period, and consequently came into the category of staples which had been brought in large quantities to such fairs as occurred towards the end of September or beginning of October. The rich Warwickshire soil for miles round Birmingham is extremely favourable to Onion crops, and consequently, at the Michaelmas Fair of the great midland metropolis, Onions became a leading feature,—so much so that the Michaelmas Fair has acquired the name of the Onion Fair, and is known by no other, though it presents all the usual features of ordinary fairs in large provincial towns. But, to the horticulturist, the great feature of the scene, the chief centre of attraction, is the great mass of Onions—in pyramids, in vast irregular heaps, or in great festoons swinging from the tops of the poles that fence in the counter of the grower or the salesman. There they are, in big piles, on every side, tumbling in all directions in their abundance, and reminding one of Byron's pen-picture of a southern vintage, where great heaps of yellow and purple grapes intermingle, and, "in Bacchanal profusion, reel to earth." Some are in loose heaps, and some in reeves or strings, the dried foliage plaited together so as to leave the bulbs in regular rows outside, like the beads of a giant necklace. In some instances poles about 25 ft. high are fixed in an upright position, with great bunches of Onions at the top, and strings of them depending on all sides, as to form a sort of tent. Other devices are made, as a kind of temple—columns, cornice, roof, all formed of Onions. In short, the Onion display is the most artistically-arranged of any in the "Bull Ring," which is the focus of the fair. The Birmingham Onion Fair is not only a pretty and interesting sight, in its Onion region, but a commercial fact of some importance; the amount of money changing hands in Onion transactions being very considerable. The prices vary, according to the abundance of the crop. Reeves weighing 9 lb. realise 6s. the dozen, and sometimes as much as 8s. and 9s.

**Sowing and Thinning.**—In large gardens the seed is best sown in drills from 6 in. to 8 in. wide. On this system the plants not only get more air, but they are more easily cleaned from weeds. Where, however, the garden is small, and only a small space can be spared for a bed of Onions, it will be found the most profitable way to sow the seed broadcast, using about 2 oz. of seed to a bed 18 ft. long by 4 ft. wide. Before sowing, whether on the drill or broadcast system, it is a good plan to moisten the seed with water, and, after rubbing it about in a cloth until every part of the seed is nearly dry again, to sprinkle some flour or lime amongst it. As the seed then becomes white, you can see where you have missed sowing, and by this means lay it on more evenly. Always put in plenty of seed, as you can easily thin out if the plants are crowded. Early in March is the best time for sowing Onion seed for the main crop, or even earlier if the land be in a fit state. Onion seed lies a long time in the land before germinating; therefore sow as early as you can,—the plants then get the full benefit of the heat in summer. Onions sown late often grub off. Thin out the plants carefully by degrees, a few at a time. When they are a foot high, or thereabouts, you may give them a final thinning, always taking care to leave such plants only as show the most blade leaves. I once asked an aged cottager in Lancashire, who was growing for exhibition, why he was so very particular about thinning out the plants? He replied by asking me the following questions: "Do you think a scallion with three blade leaves can ever make as large an Onion as one with five blade leaves? Do you not know that every leaf-blade makes a fold round the Onion, and that five folds will make a larger Onion than three folds?" I saw that the old man's idea was quite correct, and have adopted the plan ever since.

It is a common practice to thin Onions too much at first, and then, should maggot or other enemies overtake them, loss of crop is the result.

By thinning the crop out well you will have large Onions, and in fine seasons probably well ripened; but when a plentiful crop of good sound keeping Onions is the object, it is a mistake to thin them too much. As a rule, small or moderate-sized Onions are the best ripened; and a small Onion is just as good, in a culinary point of view, as a large one, if not better. For instance, small well-ripened Onions are preferred for pickling purposes; and to secure these it is the usual practice to sow the silver-skinned variety thickly, and leave them unthinned, and in this way "button Onions," as they are called, are produced. By thinning the plants out we should only get thick necks wholly unsuitable for the purpose. Long-keeping qualities are very much sought after by the Onion grower; and it is well known that well-ripened samples only will keep, and these are more certainly secured by leaving them thick in the bed. To leave the plants 7 in. or 8 in. apart, as is often recommended, is a mistake, unless Onions for exhibition only are required; but where sound bulbs—say about as broad as the mouth of an ordinary teacup—will satisfy, leave the plants close enough together to touch each other when they attain that size—that is, supposing them to be sown in rows 7 in. or 8 in. apart, as Onions always should be sown, in order to facilitate the clearing and stirring of the ground. If sown broadcast, then the plants should have a little more room. When thinning the crop, leave them about the length of the forefinger apart, and by autumn the ground will have the appearance of being fairly thatched with Onions, of a size and quality fit for any culinary purpose. Cottagers, who generally have not too much room in their gardens, often crop thicker than is here recommended; and beds may sometimes be seen that would astonish thin croppers. Sometimes the rows are only 5 in. apart, and the plants from 2 in. to 3 in., and the bulbs fairly clustered over one another, literally covering the ground—very nice samples, and thoroughly ripened; and they will keep good till June the following year. In order to satisfy oneself on this matter, let any one leave a thick and a thin row together, and weigh the produce at harvest time.

To have young Onions fit for table at all seasons, sow little and often from January till September; and to produce early bulbs, sow some of the Spanish or Portugal kinds about the 12th of August, to stand in the seed-bed, and transplant them in the month of February on well-prepared rich soil, 1 ft. apart each way. Sow again in a little warmth, in pans or boxes, in January and February; harden off in due time, and transplant in the end of March and beginning of April.

Choose showery weather for thinning Onions; but, should this not occur, give them a good watering some hours before, so as to moisten the soil, or they will not draw freely. In thinning it is necessary to have regard to the different varieties grown; large-growing kinds of the White Spanish type require more room than smaller late-keeping sorts, and must therefore be further apart in the rows as well as between.

**Soil, Manure, etc.**—The soil for Onions should be tolerably rich and well pulverised, and, if possible, that which has been trenched and either left very rough on the surface or laid up in ridges during the winter. Onions root deeply, and if the subsoil will allow of the ground being trenched 20 in. or 2 ft. deep, so much the better. It is more important to have the ground well worked, even with a moderate supply of manure, than to add a large quantity of manure and dig shallow. When the weather is dry and hot, the roots will go down to a great depth. It is always advisable to have the ground well worked and in good condition, so that the bulbs may gain solidity. Many people, cottagers in particular, grow their Onions on the same piece of ground year after year : this is not a plan to be recommended ; for Onions, like other vegetables, prefer a change of soil and situation. No advantage is gained by having this crop on the same plot for a number of years, therefore the ground is best changed every year if possible.

The best kind of manure for Onions is that from the horse or cow ; many growers, however, prefer artificially prepared manure, guano, etc. Salt and soot sprinkled over the ground previous to sowing, during showery weather, and the ground turned about with a fork, is a wonderful stimulus for the Onion. A mixture of dry wood or peat-ashes, with a portion of guano incorporated with the ashes and drilled in with the seed, has the power of starting the young plants into a quick and vigorous growth as soon as the crop is up and can be seen. Choose a dry afternoon to draw a small light harrow or an iron-toothed rake across the drills to break the surface ; then, in a few days, go through the spaces between the rows with a sharp clean Dutch hoe of 8 in. or 9 in. in width ; and, as soon as they can be properly seen, cross-hoe them with a goose-necked 3-in. hoe. It is astonishing how much such usage and timely attention will encourage their speedy growth, which is fully maintained till the crop is fit to harvest. It will also prepare the soil, and maintain it in a healthy, pulverised, sweet condition for any succeeding crop.

An excellent cultivator of Onions invariably grows them on the piece of ground which previously contained Celery. As the Celery is cleared away, the ground is trenched to the depth of 2 ft. or thereabouts, according so the depth and fertility of the soil ; and, his ground being a little stiff, he adopts the practice of throwing the rotten manure from the bottom of the trenches to the top. In dry, frosty weather, when the ground is frozen to the depth of 4 in. or 5 in., the frozen lumps are beaten to pieces with a mattock, and the surface of the ground left rough. About the last week in February or the first week in March, according as the weather proves dry and favourable, the ground is slightly forked over and the surface left as level as possible. In the course of a week pigeons' manure is thinly spread over the surface ; and, should the ground be damp, some charcoal dust is added to the pigeons' manure, in order to make the ground in as free a state for working as possible : the charcoal is also considered a fine manure for the Onion. Then the manure is forked in and the ground raked as level as possible. The seed is sown in drills 1 ft. apart, and they are not divided into beds, as it is thought to be a waste of ground if provision be made for paths. As soon as the plants are well through the ground, the hoe is used between the rows, and any weeds that may have put in an appearance among the plants are removed by hand. As soon as it can be done, thinning out is proceeded with, and the plants are left from 4 in. to 5 in. apart in the rows; and subsequently hoeing and hand-weeding are continued as often as requisite. Grown in this way, fine symmetrical bulbs are formed, with but a very slight admixture of a coarse thick-necked type—for seed is saved only from the best-developed bulbs. When the crop is fully ripe it is pulled up, and after lying on the ground for a few days, brought into a shed to finish drying. In a wet season the Onions are put into a frame or vinery, or into a Mushroom house where a little fire is kept on, in order to get them thoroughly dry, as the keeping of them entirely depends on this. A few are always selected for exhibition purposes. In dry weather these are helped with a little weak liquid manure; and as the neck begins to swell they are pinched by the pressure of the finger and thumb, so as to throw the strength of the plant into the formation of the bulb, and to secure that desired fineness of neck so requisite on the exhibition table. In this way it is not unusual to have twelve tubers weighing collectively from 12 lb. to 15 lb.—*R. D.*

**Advantage of Raised Beds.**—In order to grow good-sized Onions, one grand result is obtained by raising up the beds, and this is done by throwing up the soil from the alleys; the bed should be left in a rough state during winter, in order to get it pulverised by frost. It is impossible to do justice in sowing the seed unless the surface is in a somewhat fine and friable condition, like a potting compost. One good result of raising the beds is greater certainty of ripening the crop: in fact, it is a very important matter. Any one can grow a fat Onion with a sappy neck; but the perfection of Onion-growing is to have them large, hard, and the growth so completely finished that the top is withered at storing time. Whilst the Onion is growing it should receive no injury—not a leaf should be bruised nor a neck broken; and, though it may be necessary to break their necks in order to promote ripening, the practice is a proof either that the season is too damp, or the soil too rich, or the management faulty. When the alleys are thrown up, it naturally follows that the beds are better drained, and the Onions are warmer at the roots; gross, thick-necked Onions are produced by rank sour manure and want of drainage. Deep digging in winter causes the superabundant water to sink into the soil, and this process is absolutely necessary in strong rich soils. Another good point is obtained when the plants are kept clean and free from weeds. As soon as you perceive the young plants commencing to bulb, administer, once a week, doses of strong manure-water, which may be made in various ways. A peck of sheep's manure in about twenty gallons of water is excellent. Another good liquid manure may be made by mixing half a pound of sulphate of ammonia with twenty gallons of water. If regularly fed, they will grow to a great size, especially if they have a hot season. When you perceive the bulbs beginning to ripen, cease feeding them with liquid manure. In order to cause the bulbs to swell, it is necessary to bend the tops down, just above the crown of the bulb, by drawing the back part of a rake over them. In about a fortnight afterwards, if the weather should be fine and dry, the crop may be pulled up and laid on the bed, or any dry place, for about three or four weeks, turning them over occasionally. When the tops are dead you may tie them up in bunches, and store them in any building. They keep well hung against a wall in an outhouse or garden-shed. In some parts of Lancashire, gardeners hang them up in bunches against the garden-walls, where they remain all winter, and are taken away as wanted. Onions, like Strawberries and Roses, are fond of a dry sunny heat at the surface whilst their roots are wallowing in a rich moist soil below. Long beds 4 ft. wide are made, the alleys being rather deep, and the surface of the beds raised a little in the centre, in order to throw the water off quickly during excessive rains. These beds are liberally sown with seed broadcast, and the work of weeding and thinning out done by boys and girls. Onions can never be grown successfully on a light sandy soil—they always grub off; but there is a very large Shallot now grown, of a reddish colour, which yields an immense crop, and which can be grown successfully in any light garden soil well manured; and the Potato Onion and the Tree Onion will also grow in rich light soils. Let the bed be gently trodden down, and then raked level: lay on the garden line close to the soil for the whole length of the bed, beginning at one side; then with the back part of the rake, the head of which should be straight, make a very shallow trench close to the line, by pushing away a little soil for the whole length of the garden line; after which move your line about 7 in. or 8 in. for the next drill, and, in the same manner, make another drill by pushing away a little soil with the back part of your rake-head. In this manner go on until three or four trenches or drills are made, which must be very shallow; then sow your seed, and proceed to make more drills and sow again, until your 5-ft. bed is all drilled; cover up your drills with the rake, and pat the bed down gently; then finish off by making a pathway on each side of your bed.

**Winter Onions.**—These should be sown in August or September in sweet open soil, kept clear of weeds through the winter, and transplanted early in February. The best should be selected for transplanting, and the others be allowed to remain for use in their young state, during the spring and summer months. The transplanted ones will generally be ripe enough to lift by the end of July or early in August. The best kinds for this purpose are James's Keeping, White and Red Tripoli, and Giant Rocca.

**Varieties.**—These are now so numerous that it is not a little difficult to select the best to suit our purpose. The only way to make a suitable selection of kinds for different localities, is to sow a small plot of several kinds each year, ultimately growing those that have proved themselves to be the best. The Banbury Prize, Brown *Globe, Bedfordshire* Champion, James's Long Keeping, and White *and Red Italian Tripoli* are good kinds. The Banbury Prize is an improved form or a very good strain of the White Spanish; it is an excellent Onion. The Bedfordshire Champion is a finely-shaped Onion, which grows to a large size, and is an excellent keeper. Brown Globe is a medium-sized variety, fine in flavour, and good for early use. The crop on the same space of ground is about one-third lighter than that of Bedfordshire Champion or Banbury. James's Long Keeping is a capital Onion, which grows to a good size, and is, perhaps, the best keeping kind in cultivation. The Reading is a large, somewhat flat, and pale-skinned variety, having a very mild flavour, but it is not a good keeper; it should, therefore, be used before Christmas. The Deptford, a well-known Onion, is one of the best varieties that can be grown; it keeps well, and is generally sown for yielding a supply during winter and spring. Its skin is of a brown colour, the flesh is firm, and the flavour strong. As fine croppers and good keepers, few are any better than the Old Globe, the White Globe, the Reading, and the Two-bladed, for early salad, and when ripe for pickling. There are also the White Spanish, White Lisbon, Tripoli, and Nuneham Park. There are others which are very good kinds in their season and large growers, but they are not so good for winter storing.

White Portugal, Strasburg, and Deptford (the two last rather strong in flavour), are good croppers and good keepers. Those who are fond of eating young Onions should make a bed and sow it with the Giant Rocca, a variety only lately introduced; its flavour is much milder than any other Onion, and it is good to eat with Cucumber. The Giant Rocca can be grown to an immense size—8 in. in diameter, and 2 lb. in weight. It is now very commonly exhibited above that weight; but, in order to grow it to its full size, the seed should be sown about the middle of August; and in the month of March following the young Onions should be transplanted into a very rich bed, in drills 9 in. apart. Unfortunately, the Giant Rocca does not keep for any length of time; but its fine mild flavour, combined with large size and a beautiful appearance, recommend it strongly to every one interested in the growth of fine Onions. Other varieties that will keep can be grown this way to a very large size, when they are wanted for exhibition, such as Blood-red, Danvers Yellow (very handsome), White Portugal, Flat Madeira, Deptford, and White Globe,—all of which attain a very large size. In July and August, no Onion is equal to the Giant Rocca for stuffing. There are now several new kinds of Onions said to be superior to many of our older kinds, but they have not at present sufficiently proved themselves worthy of being placed in the front rank at the discarding of the older and tried kinds.

**Growing for Exhibition.**—When Onions are required for exhibition, it is of course necessary to have them as large as possible. To accomplish this, sufficient space, and as long a season of growth as can be given them, will be necessary. If spring-sown Onions be used for the purpose, it is advisable to sow a pinch of seed in February, in pans or pots placed in a gentle heat, or, better still, in one-light frames placed on a warm manure-bed. The seed should be sown rather thinly in light, rich soil, and kept close, and well watered until the plants are up, when they should have plenty of air given them, frequently loosening the surface of the soil between the plants; and if a little soot be mixed with some finely-sifted soil, and sprinkled among the plants and afterwards well watered in, great benefit to them will be the result. The plants should be thinned out to an inch or so apart; when the strongest can be defined, the best way is to cut off those that are not required, —for if pulled up by the roots, the remaining ones become disturbed in consequence. Those that remain must be kept close to the glass, have plenty of air given them in fine weather, and be transplanted early in April, after having been previously well hardened. A showery time should, if possible, be chosen for planting them out; if this cannot be done, the roots must be well puddled in, and if a flower-pot be inverted over each plant for a day or two, the roots will take hold more quickly, and the plant will not be so liable to flag. A distance of 9 in. from plant to plant should be allowed. When the plants begin to bulb, an inch of compost should be placed over the bed, consisting of leaf-mould, loam, and decomposed manure, in equal parts,—adding to the whole a little road-sand and a good sprinkling of soot. If kept watered during dry weather, occasionally giving a soaking of guano or manure-water, fine large Onions will be the result.

If autumn-sown Onions be used for exhibition, they should be transplanted from the seed in January, and afterwards receive the same treatment as recommended for the spring-sown ones. If, however, these be allowed to get dry during the summer months, and then rain comes, they are very apt to split, and their appearance is of course spoilt. It is therefore advisable in this case to twist their necks or pull them up on the appearance of rain after continuous drought—*i.e.*, if they be required of a good size and fit for exhibition. In choosing samples for show, those with the largest and best-shaped bulbs should be selected, and the thinner their necks the better. The more equal they are in size and shape, the more chances there will be of success.

**Onions for Pickling.**—The Early Silver-skinned is the kind best suited for this purpose, inasmuch as it does not grow so large as other varieties, and ripens quicker. The seed should be sown broadcast early in March in rather poor, firm soil; choosing a sunny spot, so that the bulbs will soon come to maturity. In sowing, the seed should be distributed over the ground as equally as possible, slightly covered, and afterwards well rolled or beaten down with the back of the spade. No water will be necessary unless the weather is unusually dry; no thinning will be required unless the seed has been thrown on in patches and the plants are in places very thick; half an inch apart will be a sufficient distance to leave them. The beds must be kept clear of weeds, the bulbs pulled up when large enough, and laid in the sun to dry. Pickling Onions come into Covent Garden during the month of August in large quantities from Bedfordshire, packed in long, narrow bags.

**Onions in Market Gardens.**—Where this crop thrives well it is a very remunerative one, and about London it is grown to perfection in fields, sown broadcast. To those who are accustomed to grow Onions in beds and in lines, this plan may seem antiquated; but those who object to it have only to take a walk in July or August through the Fulham, Chiswick, Deptford, Woolwich, or Mitcham market-gardens, to be convinced of its utility. The varieties of Onions grown in these localities are mostly the Reading, Deptford, White Tripoli, and Lisbon. The Reading, or White Spanish as it is commonly called, is a large, somewhat flat, and pale-skinned Onion, having a mild flavour, but is not a good keeper; consequently it is largely sown in spring for affording a supply between Midsummer and Christmas. The Deptford is one of the best Onions that can be grown; and, as it keeps well, it is largely sown in spring for yielding a supply of ripe bulbs in the succeeding winter. Its skin is of a brown colour, flesh firm, flavour strong, and its keeping qualities almost better than those of any other sort. In shape it varies from flat to globular. The Lisbon and White Tripoli are sown in August for spring use, when, on account of their long white necks, they are much preferred to any other sort; and whatever portion remains unsold in spring is transplanted, when they yield large soft bulbs for immediate use. Of the Silver-skinned, considerable quantities are grown in the neighbourhood of Sandy, in Bedfordshire, for pickling purposes. The main spring sowing is made of the Deptford and Reading Onions as soon after the middle of February as the condition of the soil and weather permits. If the seed be really good, Mr. Myatt, of Deptford, sows broadcast; he uses 9 lb. to the acre. If they were sown in lines he would only use 8 lb. to the acre; but the additional pound in the broadcast sowing he considers well spent in the amount of labour saved over that expended in sowing in lines. Considering the regular distances at which broadcast Onions stand apart all over the field, the produce is more than from a field of Onions sown in beds or in lines. Broadcast sowing is therefore the best for market purposes. The soil for Onions is made rich and is well pulverised, and is, if possible, that which has been trenched and laid up in ridges during the winter. In February, as soon as the ground is in good workable condition, break up freely; the ridges into which it was thrown in winter are levelled, and the whole surface is firmly trampled or rolled. The seed is then sown and raked in, and all is finished by another rolling. Nothing is placed in the ground in the way of a catch-crop from the time of sowing to that of harvesting; indeed, Onions are one of the few crops that are the sole occupiers of the ground during the whole period of their growth. The seed takes a considerable time to germinate; but if the ground be clean and well tilled, weeds will not appear much sooner than the Onions, or at least not so thickly as to choke them. As soon as the Onions have fairly come up, however, women or men accustomed to Onion cleaning are set to work amongst them. These operators are furnished with the short-handled 2½-in.-wide hoes, with which they cut down the weeds and thin the crop with wonderful certainty and expedition. The field is marked off into strips for the guidance of the hoers, to each one of whom there is a space of a couple of yards given,—so that were four cleaners employed the strips would each be 8 yds. wide. People accustomed to this work do not trample carelessly about; nor, indeed, can the crop be damaged materially by doing so, for the Onions that are thus prostrate to-day are nearly erect to-morrow. Each plantation is generally cleaned by this means three times during the season—the last cleaning being made about the end of June or early in July; and any big weeds that appear after that time are pulled out by the hand. Towards the end of August, or early in September, the Onions, being ripe, are harvested when dry. Those that are green and thick-necked are laid aside for immediate sale; but the firm and sound bulbs, particularly of the Deptford kind, are either cleaned of any loose scaly skins and spread out a few inches deep over the floor of a loft, or tied into bunches and strung in twos over poles or on pegs in a loft or shed, so that they can be marketed at any convenient season during the winter and spring. The autumn sowing is made on ground cleared of Cauliflowers, Cabbages, or other early crops. The first sowing, consisting of the White Spanish, White Tripoli, or Lisbon, is made in the last week of July, for drawing in a young state from September onwards; but the main sowing is not made till about the end of August. The autumn sowings are always made in beds about 5 ft. wide, with 1 ft. alleys between them; and the seeds are covered deeper than those of the spring sowings. Autumn sowings of Onions are seldom made broadcast on fields, as they must be weeded, not hoed, in the process of cleaning. The hoeing would thin them too much; as they are only required for drawing when young, they do not need to be more than one-third of the distance asunder required in the case of summer Onions. They are weeded soon after they come up, and once or twice during the winter. Weeding is performed by women in dry weather, each of whom takes a basket to put them in rather than throw them down in the alleys.

In marketing these Onions they are cleared off the beds in large patches, and not by picking out the strongest and leaving the weakest, as is generally done; and they are washed, which makes their long necks look clean and inviting. If a portion be intended for transplanting, a piece of well-prepared rich ground is made ready for them, rolled firmly, and lined off into rows about 9 in. apart, and into these lines the young plants are dibbled about 6 in. apart.

**Underground Onions.**—These, like the Potato, produce a number of bulbs or offsets round the base of the growing stem produced by the parent plant, when root action commences in the spring. It is by this means that propagation is effected. Though comparatively little grown, this kind of Onion may always be depended on. Even when *all others fail,* they keep well through the winter, and give a good *supply in the spring* when other kinds are scarce.

The bulbs should be planted in good rich soil in January or February, when the ground is in working order. It is a custom with some growers to plant underground Onions in the same manner as Potatoes, and earth them up after they have shot up high enough to admit of the soil being drawn round the bases without burying the tops. Other growers plant 2 in. or 3 in. deep, and afterwards cover them over with 2 in. or 3 in. of leaf-mould or rotten manure ; and some growers, on the contrary, clear away the soil from the base of the plants as soon as the leaves have shot out to their full size, and expose the young bulbs as much as possible. The latter plan is no doubt the best to produce bulbs for keeping ; but either of the former plans will produce larger Onions and in greater clusters.

**The Tree Onion.**—In order to attain perfect success, the following three methods of culture must be adopted in order to get the three sizes of bulbs wanted—viz., one size for kitchen use, another for pickling, and the third size for seed, in order to obtain a larger size still for kitchen use.

Firstly, all the bulbs to be planted are best put into the ground triangularly, about 8 in. apart, using Onions about the size of Nutmegs ; they may be planted singly, but in that case require an enormous quantity of sticks for support ; when they are planted in triangles, one stick supports the growth of three Onions. When the bulbs have grown about 1 ft. high, a stick from 3 ft. to 3½ ft. long must be thrust into the centre of each triangle, and the growing shoots tied to it for support. Tree Onions should be planted about the middle of March, just covered by the soil ; they soon begin to grow. In the month of June, a bunch of Onions, varying in number from four to eight, will make its appearance at the top of one or two stiff stems. Two stems are generally sent up from one Onion. Soon afterwards another shoot is seen growing out of the bunch of Onions forming the first tier, which generally attain the size of large Nutmegs, and again another bunch of Onions is produced, smaller than those on the first tier. In due time another stem is produced, containing another bunch of Onions of very small size. This third bunch it is of great consequence to protect, by securing it carefully to the stake. Most cultivators never take any care of the little Onions produced at the top of the tree ; they are so very small, being only about the size of the nail of the little finger, and in many cases smaller still. It will be seen that three tiers of bunches of Onions are produced on one stem, and that each Onion planted generally produces two stems, rendering them very prolific ; but, in addition to this, two good-sized usable bulbs are formed in the ground. The second plan of culture only differs from the first in nipping out all shoots which grow above the first tier, the effect of which is to produce only one bunch of good-sized Onions on each of the two stems, besides the bulbs in the ground. Onions produced by the second plan are quite large enough for the kitchen, the picklers having been nipped off. The third plan consists in making a bed of Onions, such as those produced from the common Onion seed. A bed 4 ft. wide must be prepared, by digging in plenty of manure, or using guano in proportion of 1 lb. to every 3 ft. in length. This must be spread about and dug in. About February, or early in March, plant out the little rubbishy Onions before mentioned, grown on the third tier, in rows 6 in. wide and 6 in. apart. Plant out every one of them; the smaller they are, the finer Onions are produced. Do not plant deeper than about half an inch. In due time these little Onions will grow into large ones, and will have the same appearance exactly as those produced from seed; but you have the pleasure of not losing them by the maggot, and you have no trouble of thinning out scallions. You want no sticks to them, as they do not send up a stem with bunches of Onions formed in tiers one above another. The most curious part in this third mode of culture is that the Onions appear to have lost the character of the tree Onion for a season; but if you plant one of the large Onions produced in this way, the true character of the tree Onion is produced again. The tree Onion will grow in almost any kind of soil, and is particularly useful to persons having a sandy or gravelly soil where it is difficult to raise Onions from seed. It is very useful for pickling, is quite a curiosity in its way, and can be rendered very profitable. As I plant several hundreds of Briars in my back garden every year for the purpose of budding Roses, I generally plant about three tree Onions at the foot of each Briar. The Briars act as supports, and the Onions are not in the way at budding time. I make the Briars do double duty. Take up tree Onions early in October; those grown on the upper tiers are not ripe before that time. If growing upon the second plan, nipping the tops off when one tier is grown, is adopted, the Onions upon that tier will be ripe early in September.

**Diseases.**—During June, Onions are much troubled with the maggot. If the young Onions turn yellow and drop on the ground, they are attacked by a fly, Anthomyia ceparum. The grub which does the mischief is white, shiny, and cylindrical; it measures from ¼ in. to ½ in. in length; it eats its way into the heart of the Onion and destroys it. As the fly lays its eggs within the leaf-sheaths of the plant close to the ground, any noxious top-dressing not injurious to the plant may be used to keep the fly at a distance. The beef fly would not deposit its maggots on the Onion, neither would the Onion fly deposit its maggots on the beef. Every fly has a nature of its own, which cannot be changed. Tansy, mint, or any other strong herb placed on a piece of beef, throws the beef fly off its scent, and it will not alight on it, nor attempt to deposit maggots thereon. The Onion fly can smell the Onions growing on the bed, and it will not lay its eggs on any other plant; hence, soot with guano, or gas-lime from the gas works, when thrown broadcast on the bed, are excellent remedies; for these top-dressings not only throw the fly off its scent, but they stimulate the young Onions into a vigorous growth, and they soon get too large and tough for the young maggots to penetrate, which thus die for want of food. The fly only attacks Onions when they are very young, and in a tender state. The best remedy known is a heavy top-dressing of soot, and it is astonishing what a large quantity can be used without injuring the plants. Deep trenching and plenty of manure will generally be found the best preventives of the vermin that destroy the Onions.

## Oxalis Crenata.

THIS is a plant seldom cultivated in England, although possessed of enormous yielding properties; its direct usefulness has not at present been ascertained. It is largely cultivated in Mexico, and, according to Thompson, in Peru; but in Great Britain the season is apparently too short, as a rule, to bring it to a high state of perfection in the open air. The tubers, which are similar to those of the Potato, are full of eyes—which fact, of course, at once points to the cause of its prodigious cropping qualities. The tubers are about the size of seed Potatoes, and are cooked and eaten in a similar manner; many people, however, use them, after boiling with other ingredients, such as Endive, Lettuce, etc., in the form of a Salad. They are said to be very wholesome, and delicious cooked and served in any way. The foliage is also sometimes used in Salad, resembles in flavour the leaves of the garden Sorrel, and is in the idea of many greatly superior to it. The propagation of Oxalis in every way resembles that of the Potato. It may, however, be planted much more closely together. Being very tender, it is advisable not to plant until May or June, in light, warm soil—earthing up, etc., being done exactly as in the case of Potatoes. By the end of September the tubers will be fit to dig, but in this country are seldom found to be very large. In warm districts, however, a fair amount of success may be attained.

## Oxalis Deppei.

THIS is a Mexican species which has long been known in English gardens. The tubers, which in shape somewhat resemble Short-horn Carrots, are not rhizome, like those of O. crenata, but are well developed, fleshy, and transparent, and when cooked have an agreeable flavour. They are raised in April or May from clove-shaped offsets, which are produced in large quantities at the collar of the roots. These should be planted in good mellow soil, at distances of 18 in. or 20 in. apart, and should be earthed up like Potatoes, in order to assist the development of the tubers. In cold districts the latter ripen but slowly, and should not be lifted until late in the autumn. If frost be apprehended, the beds should be covered with a mulching of dry leaves. After the tubers have been lifted and dried by exposure to the air, they should be placed in a dry store, free from frost, where they will keep sound all the winter. Mr. Tillyard, when gardener to the Duke of Buckingham at Stowe, showed at one of the Royal Horticultural Society's meetings specimens of this Oxalis; and, concerning its productiveness, it was mentioned that 18 square yards produced 980 roots weighing 217 lbs. This result was obtained from a piece of ground which had at one time been a walk—the gravel and sand, with the addition of some leaf-mould, being trenched up together. The sets in this case were planted on the 2nd of May.

## The Parsnip

*(Pastinaca sativa).*

THIS is a native of Britain, and may be found in abundance in its wild state by roadside ditches, etc., where the soil is deep. The cultivated form of the Parsnip of the present day is very different in appearance from the original plant when first taken in hand by the cultivator and moved from its swampy habitat. Like many others, it is an evidence of what can be accomplished by attentively studying the nature and requirements of plants, and by a careful selection of individual examples that show some superiority in their form, size, and vigorous constitution. From the fact of its being indigenous to this country, it will at once be apparent that, if subjected to any ordinary good treatment, it may be had in perfection, and it will well repay the labour expended in attention and good cultivation.

**Soil.**--Although the Parsnip will grow in almost any kind of soil, it succeeds best in land that is neither over-light and sandy on the one hand, nor too heavy and adhesive on the other. The form of the root, penetrating as it does for a considerable distance straight down, at once shows the necessity for a sufficient depth of soil to admit of its extending; consequently the ground should be well and deeply dug, so as to readily allow its descent whilst the root is young and delicate. The soil should be moderately rich for Parsnips to grow to a large size, in which condition they are quite different, both in flavour and texture, from the stunted, starved productions resulting from poor hungry land and negligent cultivation. But although the Parsnip likes to be well nourished, it is not advisable to grow it in land that has immediately before received a heavy dressing of manure, as so treated the roots are liable to be cankered or affected with grub. It is best to grow it after some other crop that has been well manured, such as Onions, Cauliflowers, or Lettuce, trenching or deeply digging the ground over in the autumn, and leaving it as rough as possible on the surface. Should the soil not be suitable for the crop on account of its poverty, some manure ought to be added in the autumn, which will be much better than adding it at the time of sowing; mixing it regularly with the soil as the work proceeds.

**Sowing and Thinning.**—About the middle or latter end of March, according as the locality may be early or late, as soon as the land is sufficiently dry, let it be well forked, reducing all the hard lumps that exist—not merely making it smooth on the surface, but quite as deep as the fork or spade goes. This is necessary for most plants, but particularly so for Parsnips, or the roots are liable to grow forked. With this, as with all other spring-sown crops, never be *guided by a certain date*, even to a week, in the time of sowing, if *the state of the land* be such as not to favour the sowing of the seed; it is always better to wait than sow when the soil is too wet—the effect of which is that it does not germinate freely, and the land gets compressed and never works kindly throughout the whole season. Sow in drills 1 in. deep, and from 15 in. to 18 in. apart, according to the more or less rich condition of the land. All that is afterwards required is timely thinning, leaving the plants 10 in. or 12 in. apart in the rows, and the careful destruction of weeds by frequent hoeings throughout the season.

**Storing.**—With the view of being handy to get at, many take up the roots towards the end of October and store them in sand or ashes; but they are vastly superior if left in the ground. In this way they are not liable to get spongy or strong-flavoured, which they sometimes do when stored under cover. If the ground occupied by the crop is required for other purposes the roots may be dug up and stuck in mounds or damps, in the same manner as Potatoes, or a deep trench may be dug and the roots placed perpendicularly in it close together, afterwards covering them over with soil to a depth of 6 in. So far as regards varieties, the Hollow-crowned kind is a good one, and so is the Student, by some considered superior in flavour. There is no harm in trying both. Some soils will favour one kind a little more than the other.—*T. B.*

**Parsnips in Market Gardens.**—In some market gardens Parsnips constitute one of the principal crops, while in others none are grown. Where Parsnips do well, however, they are very remunerative. As a rule, market gardeners select a piece of ground for Parsnips that has been heavily manured the year before and cropped with Cabbages, Cauliflowers, French Beans, Celery, or similar crops, which have been cleared off in time to allow the ground to be trenched and ridged for at least a month prior to levelling it down for sowing. The variety almost universally grown is the Hollow-crowned, a capital sort, that produces roots from 4 in. to 6 in. in diameter at top, and from 10 in. to 20 in. in length; and the crowns are, as a rule, buried a little below the surface soil. Preparatory to sowing, the ground is levelled, breaking the soil well in the operation, and finishing off by raking the surface smooth with a wooden rake, and sometimes rolling it. Shallow drills are then drawn for the seeds at about 18 in. or 20 in. apart; and, after being sown they are covered in by the feet or the back of a rake, and the whole is smoothly rolled. Sometimes, however, white or green Cos Lettuces are planted in rows at the above distances, and the Parsnips are sown afterwards in lines between them. In either case, Lettuces are planted—if not first, they are put in afterwards; and as the Parsnips take a long time to germinate, the Lettuces are removed before they injure them. The proper time for sowing is a much disputed point with gardeners, but nearly all agree that March is the best time. The market gardener, however, always makes a point of sowing Parsnips as soon after the middle of February as possible, provided the ground is moderately dry and warm, and crumbles freely when working it. The land is not manured for this crop; if it were, the roots, instead of forcing their way downwards perpendicularly, would ramify and become forked. Fine fields of Parsnips are grown by Mr. Bagley, of Turnham Green. The ground on which they grow is rich, deep, and rather heavy—a fault remedied, however, by continued manuring, working, and cropping. The year before this crop is put upon it, it is heavily manured, and cropped with Cauliflowers, Lettuces, and Celery. After the Celery has been marketed, about Christmas time, it is levelled, trenched and ridged, but not manured, and in the middle of February, the soil being in fine condition, the ridges are levelled, and the seed sown in rows 20 in. apart. White Cos Lettuces are planted between the rows, about a foot apart plant from plant in the row. The ground is hoed between the Lettuces before the seeds germinate, and when the Parsnips are expected to appear the soil is raked lightly over the rows, so as to dry and sweeten it, and to free it from lumps, that the young plants may push through it easily. As soon as the Parsnips are fairly up and growing, they are thinned out a little, and after another short interval again thinned, this time finally, to 9 in. or 10 in. apart. The Lettuces, when marketable, are tied up and removed, before they can choke or otherwise injure the Parsnips. These soon grow apace, and receive no further care than occasional hoeing; and, after they get too large for that, all the rank weeds are picked from amongst them. The roots make wonderful growth—so much so that, in many cases, cracks are visible along the lines in which they grow. The bulk of roots from these fields is enormous, many of the specimens measuring individually 7 in. and 8 in. in diameter at the shoulder, and 20 in. and 24 in. in length. It is injudicious to lift Parsnips for market before November, unless the demand for them is great and prices high, as they have not finished growing till that month. From that time until the middle of February, however, they are in fine marketable condition, and, being always left in the land where they grow, are lifted as required. Being thus left undisturbed, they preserve their flavour much better than they do when lifted and stored in pits.

## The Pea

(*Pisum sativum*).

The Common Pea is supposed to be a native of the south of Europe, and was introduced into this country in the sixteenth century. The uses of the Pea are familiar to every one, and it forms one of the most useful of summer vegetables. Few vegetables have become more improved of late years than the Pea, both as regards varieties, quality, earliness, and productiveness. There are now so many good kinds, both early and late, and so many different modes of culture, that it is almost an impossibility to fix upon any particular selection, or say what system of culture we shall adopt. Most cultivators have, in Pea-growing, as in other things, a system of *their own*. Years ago Peas were sown early in November and *December; now that* is seldom done. When sowing in November was in fashion, there were only comparatively a few varieties in existence, and these differed little from our present field sorts. We now propose to offer a few remarks on Pea culture in general, and also on the varieties most suitable for garden purposes.

**Early Peas.**—Where the first crops of Peas, owing to want of convenience, are obliged to be grown out of doors without protection, the warmest and most sheltered situation that can be got should be assigned to them. A Peach border, facing the south, is generally chosen for them; if, however, an old wooden frame can be spared for them, having a temporary covering in severe weather, they may be gathered a few days earlier than they otherwise would be. Where choice and expensive sorts are grown, it is not advisable to sow them out of doors, they being liable to many enemies; indeed, it is best to start all early Peas in heat, harden them off, and then transplant them to the open ground. For this purpose nothing is better than turves cut 18 in. in length, 6 in. in width, and 1½ in. thick. These should be placed on shelves or borders in early Peach-houses, Vineries, etc., and the Peas should be pricked into them in rows. A turf 6 in. wide will take three rows across; and if the turf be 18 in. long it will take eight rows, thus making a total of twenty-four Peas in each turf. Where, however, turves are not procurable, long boxes may be used with success. They should be made 6 in. deep, and 4 in. wide at the top and 8 in. at the bottom. The bottom should be secured to the sides by means of small hooks, so that when planting time arrives they may be easily removed to admit of the whole bulk of soil slipping out into the trench; but a better plan still is to have bottom, sides, and ends, so that they may be taken to pieces, as otherwise sometimes the soil adheres to the sides, and occasions the breaking of the ball. Pots are sometimes used, but they are much more troublesome than boxes or turf, and do not answer the purpose nearly so well. Where boxes are used they should have some rough soil placed over the bottom (which should be perforated), and then filled to within an inch of the brim with good loam, the Peas being pricked in, as recommended in the case of turves; they should then be kept moderately moist. When they are up they must be placed as close to the glass as possible, in order to insure sturdy growth, gradually hardening them off as they advance in cold frames, and giving them plenty of air until the weather is sufficiently favourable for transplanting them out of doors. If sown the first week in January, they will be quite forward enough for planting out, and be better than if they were sown earlier. The planting should, if possible, be done in dry weather, as then the soil will work so much better than when it is wet; it is better to defer planting for a day or two than get on the ground whilst it is saturated with water. The trenches to receive the plants should be sufficiently deep to admit of the balls or turves being sunk 2 in. or 3 in. below the surface of the surrounding soil. As soon as planted, they should be earthed up, and a few sprays of Gorse, or branches of Firs or Laurels, may be placed on the northern side of them, in order to afford a little protection; but they should not be so thick as to cause them to draw up weakly. A thin coat of coal-ashes spread along each side of the rows, too, will help to prevent the attacks of slugs and snails. The distance at which the rows should be apart will depend upon the varieties grown; if dwarf kinds, 2½ ft. will be a good distance, but if taller kinds, another 6 in. may be allowed. It is not advisable, in the case of early Peas, to plant too many varieties at a time, unless a large space is to be occupied with them; for a dish consisting wholly of one sort is always more satisfactory than a mixed one arising through not having enough of any one kind to insure a good picking.

**Varieties of Early Peas.**—The best early Pea at present in cultivation is undoubtedly William the First: it is not quite so early as First Crop or Ringleader, but its quality and productiveness compared with these varieties more than compensates for its being a day or two later. Still, where very early Peas are in request, it is well to grow one of these sorts, in order to have a picking as early as possible. Ringleader and First Crop are the earliest, and no doubt possess certain advantages over the other varieties; for instance, they stand the frost better than many others. Mr. Gilbert, of Burghley, writing of early Peas, says: "I had sown on November 17th, William the First, Sangster's No. 1, Sangster's Improved, and Racehorse; the three last-named varieties only appeared here and there, but William the First was full in row and of a dark-green colour. I can highly recommend the Pea to my gardening friends." Blue Peter, Multum in Parvo, First Crop Blue, Little Gem, Kentish Invicta, and Emerald Gem are all excellent early varieties, and are well spoken of by the gardening public; but if only one variety of early Pea be wanted, that should be William the First. It is one of the earliest, if not the earliest, of Marrow type: it is of excellent flavour, and an abundant cropper. The next best is, perhaps, Blue Peter or First Crop Blue.

**Main Crops.**—There are various ways of obtaining successional crops of Peas all through the summer months. Many prefer to plant a large plot of ground with a number of varieties that will naturally succeed each other; others select a few good sorts, and sow them at intervals of three or four weeks, as the case may be,—a good plan in some cases, but inasmuch as a number of excellent kinds may now be had to follow each other, naturally we would recommend that plan. The principal sowings will require to be made in March, April, and May; and if the plan of successional sowings be practised, the intervals between each must depend upon the varieties grown, as some come into bearing much sooner than others. Many make it a rule to sow as soon as the plants of the previous sowing appear above ground; but this rule should not be made absolute, for, if the weather be favourable, one sowing should not be made so close on the heels of the other. If sorts be employed that do not naturally form a succession, sowings must be made at intervals of a fortnight or three weeks, according to circumstances. Much depends upon the time of year at which they are sown: for instance, Peas put in at the end of May would naturally take less time to come into use than those sown in February or March. The best way to insure a regular supply is to note from time to time how long each variety is coming into bearing, calculating from the time of sowing, and making allowance for the season at which it is sown. As regards sowing, many sow deep, others not; and trenches have of late even been used for Peas. These are doubtless in many instances advantageous; but, as a rule, we prefer drawing wide drills to a depth of 3 in. or 4 in. Mr. F. R. Elliott, who some time ago tried some experiments in order to ascertain the best depth at which to sow Peas, says: "Buried 2 in., they came up soon, but did not last long; at 3 in. and 4 in. deep they came up three or four days later, did not bear quite so early, but yielded a heavier crop, and continued in bearing much longer; at 5 in. and 6 in. deep they came up two or three days later, still grew about as vigorously as the others, and continued in bearing still longer; at 8 in. and 10 in. deep they were still longer making their appearance, but did not produce nearly so well as those in shallower drills. A few straggling, feeble plants came up when the seeds were put 1 ft. deep." It will be seen, therefore, that the best and most profitable depth at which to sow Peas is about 5 in. or 6 in., except in heavy soils, in which they should not be sown quite so deeply. The best distance apart at which to plant main or succession crops must, as in other cases, be governed by the varieties grown. If the kinds be tall, at least 6 ft. between the rows should be allowed, but dwarf kinds may be sown a little closer. Nothing is gained by overcrowding, as by so doing both light and air are, to some extent, excluded, causing the haulm to assume a feeble, weakly habit. Some sow Peas broadcast in the rows; others place each Pea separately in the drill,—a good practice when time can be spared for such work, as they come up more regularly, and afterwards grow more evenly. Mr. Pragnell, of Sherborne Castle, who is well known to be an excellent Pea grower, draws his drills to a depth of 3 in. or 4 in., and about 6 in. or 8 in. in width; he then fills them in with some rather light sandy soil of a yellow colour, previously sifted through a rather fine sieve; this done, he levels the soil with the back of the spade; the Peas are then pricked in. In each drill there are three rows about 2 in. apart, the distance from Pea to Pea in the rows being rather more than 2 in. For measuring the distance he has a small round bar of iron or wood in which there are three teeth, about 2½ in. long, placed at the proper distance apart, and a handle attached to the top. The teeth are made large enough to make a hole capable of easily admitting a Pea, and they are also made with a blunt point so that the Pea will drop to the bottom of the hole. Of course this is a mode of sowing which consumes much time, but it is not wasted, for the crop amply repays the labour thus bestowed upon it. The Peas come up all together, and regularly in the row. Mr

Pragnell, too, never allows a Pea to be put in the ground about the growth of which he has any doubts; the small and inferior ones are all picked out and cast aside. When the sowing is over, Pea wires are placed over the rows, where they remain until the height of the Peas necessitates their removal. Many sow in single rows, allowing a distance of 4 in. or 5 in. between each plant, but this is only done for exhibition purposes. Many sow tall Peas here and there in short rows at long distances apart, and plant other crops between them; but this is a plan which we cannot recommend.

**Varieties for Main Crops.**—Tall varieties of Peas are no longer necessary, inasmuch as we have now many excellent dwarf kinds; but where there is plenty of ground, and sticks at disposal, some of the taller varieties may be grown with advantage, as they generally continue in bearing longer than the dwarf kinds. In small gardens the latter are, however, best, as they do not shade other crops. In making selections of Peas, the locality in which they are to be grown must not be lost sight of. Many kinds succeed admirably in some places, whilst in others they will not thrive at all satisfactorily. Veitch's Perfection, for example, when well grown, as we have frequently seen it, is one of the very best Peas, both in quality and productiveness, but in some localities we have often known it to fail. Mr. Gilbert says, "Veitch's Perfection is good only in some people's hands. With me it has failed for the past seventeen years; therefore, in selecting Peas, we must get kinds most likely to succeed in the locality in which we reside, and this can only be discovered by trying new varieties in a small way, and selecting those that are found to be most suitable." The best kinds for main crops are G. F. Wilson, James' Prolific, and William the First. These are unsurpassed; they grow to a height of from 3 ft. to 4 ft., are heavy croppers, and are in every way excellent. Commander-in-Chief, Giant Emerald Marrow, Duke and Duchess of Edinburgh, Ne Plus Ultra, and Champion of England, are also excellent, but they grow much higher than those just named; where however, height is no object, these varieties are decidedly the best of their class. Laxton's Supreme is largely grown in many places, and where productiveness is the chief aim it is well worth attention; the pods are large and well filled, but the Peas are deficient in flavour. Excelsior Marrow is likewise a good Pea, as is also McLean's Advancer; but after carefully testing the merits and demerits of numerous varieties, we have come to the conclusion that, though there may probably be others as good, yet, taking all points into consideration, there are certainly none better than those we have just mentioned. New kinds are continually appearing in seed lists; but a good rule is never to exchange well-known, tried varieties for new comers, until we are sure that the latter are worthy of a permanent place in our collections.

**Late Peas.**—In many places, if not in all, the long continuance of the Pea season is a matter of no small importance, late Peas often being quite as much prized as early ones; and by selecting suitable sorts and adopting a liberal mode of cultivation they may be obtained of good quality late in autumn, provided the weather is tolerably genial. Upon the latter much depends, but a good deal also, upon the treatment which they receive. No one can successfully grow late Peas unless they manure liberally and water freely. To have Peas in July and August is comparatively easy, but to have them late in October is a different matter ; in that case they require higher cultivation than earlier varieties, in order to obviate the attacks of that greatest of all enemies to late Pea crops—mildew. As regards sowing, the method employed in the case of main crops is, to some extent, applicable to late crops, but the latter should, if possible, have more room allowed them both in the drill and between the rows, so as to give them all the light and air possible—agencies indispensable in growing late Peas successfully. Sowing in trenches is often practised where the soil is naturally of a dry, hungry character, and it is a system with which we quite agree, as by it the roots can be much more readily soaked with water, should that become necessary, which is generally the case in even ordinary dry summers. Where this system is adopted the best way is to open trenches 2 ft. wide and 18 in. or 20 in. deep, according to the depth of the soil ; part of that taken out should then be mixed with good rotten manure, that from piggeries and earth-closets being often used ; but, as a rule, nothing is better than good rotten manure from the stables. Cow-manure is also excellent, and where it can be readily obtained it should be used along with that from the stables. The trench should then be filled up to within 5 in. or 6 in. of the surface, and the Peas should be sown in double rows along the trench, inserting them as near as possible at equal distances apart ; from 4 in. to 5 in. is a good distance for late Peas. Under such circumstances they grow stronger, and continue much longer in bearing than when planted more closely. They should then be covered to a depth of 3 in. or 4 in., leaving the surface of the trench 2 in. or 3 in. below the level of the surrounding soil ; this will be quite sufficient to retain water, and deeper trenches only lessen the depth of soil available for the roots. The manure should be thoroughly incorporated with the soil in the bottom of the trenches,—an important matter, inasmuch as it encourages the roots to descend beyond the influence of heat and drought, and in this way obviate the attacks of mildew. The time of sowing depends greatly on the varieties grown, but all late Peas are generally sown from June to the end of July, and sometimes a few dishes may be obtained in the end of November and beginning of December (if the weather be favourable) by sowing early in August. Where this is done, a light, sunny situation is essential, and if in any way protected from the fierce, stormy winds that often blow at that time from the north, so much the better.

**Varieties of Late Peas.**—Although some new and valuable varieties have been lately added to collections of late Peas, we do not think that any of our well-tried standard kinds should be discarded to make way for them. Dwarf Peas, as a rule, are seldom sown for late crops, as they do not continue in bearing so long as the taller ones. Our greatest favourite is Ne Plus Ultra; and when only one variety is required to be grown, that Pea should be selected. It is a tall grower, and requires to be well staked, but it amply repays that trouble. It is a good cropper, a continuous bearer, and, as regards flavour, unsurpassed. British Queen, Knight's Tall Green Marrow, Williams' Emperor of the Marrows, Champion of England, and Victoria Marrow, rank among the best of old varieties; whilst Sutton's Giant Emerald Marrow, James' Prolific, Fillbasket, G. F. Wilson, and Laxton's Omega, are the best amongst new kinds, and useful for earlier gatherings, but for the latest crops the former are decidedly the best. We have known many sow early Peas for the last crops, but they invariably fail to produce enough to repay the trouble involved in their culture; here, however, they will succeed. William the First is best for the purpose, and it may be sown two or three weeks later. In order to retard in some measure the last sowings, the points of the shoots may be nipped out as soon as the first blooms show themselves; this will induce them to become bushy, and will delay their cropping a fortnight or three weeks, without in any way impairing the amount of produce. If a few Peas be required for purposes of exhibition, Laxton's Superlative and Supplanter are, perhaps, two of the best varieties, having very large pods, covered with a beautiful bloom; for general purposes they are, however, comparatively useless.

**Sticking Peas.**—Various modes of sticking are practised in different parts of the country, but none of them beats Pea-sticks made of tops of trees or underwood; Hornbeam is perhaps as good as any when it can be obtained; Hazel and Ash, too, are often used, and answer the purpose admirably. In preparing the sticks they should be made flat or fan-shaped, just taking off the straggling shoots at the top, in order to give them a neater appearance; little time need be spent in sharpening—one usual cut made in a slanting direction being all that is needed; a little judgment must, of course, be used in cutting them to the required length for each variety, too short sticks being comparatively worthless; care, too, should be taken to place them wide enough apart at the bottom, and upright,—*i.e.*, not sloping inwards at the top, as is usually the case, allowing the haulm to escape at the sides, instead of finding its way to the top inside the sticks. In the case of very tall Peas it is a good plan to put a short stick and a long one alternately on each side of the row; when, however, sticks cannot be had readily, a few stout poles or stakes driven firmly into the ground, 5 ft. or 6 ft. apart on each side of the rows will answer. These should be all of one height, which should be that of the Peas; some tar twine or other strong cord should then be tied to the end stake and passed along the line, making a turn on each stake within a few inches of the ground, and as growth progresses the next turn should be raised a little higher up, and so on until the plants have attained their full height. If the string or cord be applied at the right time, the tendrils of the Peas will clasp firmly round both stakes and strings, and will support the plants almost equal to Pea-sticks ; some, indeed, think this plan best, as by it the plants are exposed to more light and air than they otherwise would be, and the pods are more easily picked without injuring the haulm. Light galvanised wire hurdles are likewise used in some places for supporting Peas ; and they are not without merit, inasmuch as they are neat, are speedily applied, and last long. Market gardeners seldom stick their Peas ; they allow them to come to maturity, then pick them and pull them up. They are seldom gone over more than once or twice ; and for market purposes this answers very well, but where a continuous supply is desired sticks are decidedly needed. When they are not employed, stopping the points of the shoots is often practised to induce the plants to grow more dwarf and bushy, which in this case is no doubt advantageous ; but, as a rule, little is gained by stopping. It is said by some to throw the energy of the plants into the pods, but it is a question if it be not as harmful as beneficial. Where a crop of Peas is required to be fit for use on a given date, and where from all appearance it is not likely to be ready by that particular time, we have frequently seen the tops of the shoots removed, and only the most forward of the pods left. The moulding-up of Peas after they have been sticked is generally done with a spade ; a line is stretched along the side of the row, in order to make straight work, and the soil is then carefully placed round the bases of the plants. Too much soil should not, however, be put around the stems of Peas, as the roots push from the stems with considerable reluctance, and the earthing-up throws off the water instead of allowing it to descend to the roots.

**Mulching and Watering.**—Mulching with various materials is an excellent practice, and one which deserves more attention than it generally receives, as the benefits to be derived from such treatment are very great. The mulching keeps the roots cool and moist, and is especially useful in shallow soils ; in clayey lands, too, which break into large fissures during the drought, mulchings enable rains, when they come, to thoroughly soak the whole of the soil instead of running down the cracks—thus leaving the chief portion of the roots dry, and inducing mildew. The best mulching material depends greatly upon local circumstances : where, for example, Sea-weed can be readily obtained it makes a good covering, inasmuch as it retains moisture for a great length of time. Where, however, this cannot be got, half-rotted manure, such as that from old linings or Vine borders, makes perhaps the next best mulch. We have likewise frequently seen flags of the Yellow Iris (I. Pseudacorus) cut from the river-side and used for the purpose ; and lawn mowings may also be employed where nothing better can be had, though they are apt to fill the ground with weeds. Before mulching, should rain not come, a thorough watering should be given, first pricking the surface over with a fork in order to allow the water to penetrate it readily—after which put on a good coating of the best material at hand, covering as much of the soil as possible, and if 6 in. or 8 in. thick all the better. If this be done properly, and a good watering given once a week, or as often as seems necessary, the plants will never sustain any sudden check through excessive drought. A good dose of manure-water or guano-water given sometimes will greatly improve the crop. Watering, be it observed, should be done thoroughly: far better to water half the crop at a time and do it well than only half do the whole. Pouring water close to the stems of the plants is a practice which is best avoided, as it sometimes causes them to rot. In very dry weather a sprinkle overhead in the evening will be found to be beneficial to the foliage, and also to assist the setting of the blooms.

**Soils and Manures.**—The most suitable soil for successful Pea culture is a rich friable loam; and where it is found that the soil does not contain a sufficient quantity of calcareous matter, it should be added in the shape of lime, chalk, etc. For early Peas, however, a lighter soil answers better, especially where very early crops are wanted,—the object in that case being earliness rather than productiveness; but for main and late crops the soil requires to be of a more tenacious character, and should be deep, so as to admit of the roots running downwards in time of severe drought, otherwise continuous waterings will have to be resorted to in order to prevent an attack of mildew. Whenever a crop of Peas has been subjected to severe drought, especially if after the blooming has commenced, the pods are never so large and full as if they had been kept continually growing without check from the commencement. It is good practice, where it can be done, to sow Peas on ground that has been occupied by Celery the previous year, as in that case the soil will have been deeply moved, and, if properly treated, will be in good condition for the Peas as regards richness. Mr. Pragnell, to whom reference has already been made, always trenches a piece of ground for his main crop of Celery, giving it at the same time a heavy dressing of manure, lime, or whatever is most needed; the trenches in which the Celery is to be planted receive a good coating of manure prepared in the autumn, consisting of horse-droppings, cow-manure, soot, salt, and lime. When the Peas are sown the following season, care is taken to have them exactly where the Celery trenches were; and one has only to see his Peas growing, or to inspect the specimens of them which he exhibits from time to time at some of the great London shows, to be convinced of the excellence of his mode of culture. In localities in which the soil is of a light character, the trench system is best, as in that case a proper quantity of marl, clay, or heavy loam well pulverised can be added with facility. In all cases the ground should also be properly drained, as few crops succeed well in wet, badly-drained soil. Many kinds of manure are used—such as that made by pigs, sheep, fowls, deer, etc.; and many employ artificially-prepared manure,—but for general purposes the best is horse or cow manure, a little soot being added to keep away worms.

**Gathering.**—If prolongation of bearing be desired, Peas should not be gathered indiscriminately, as is often done, but the oldest of the pods should be removed as often as possible after they have become fit for use, inasmuch as one pod allowed to get old will weaken the bearing properties of the plant more than many young ones; therefore it is better to gather and throw away than allow them to remain on the plants after they are fit for use. In plucking the pods from the haulm both hands should be used, so as not to break and damage the plants, picking only such pods as are moderately well filled, for if young and old be gathered together they boil unequally. Gathering for exhibition is also an operation that does not generally get the care bestowed upon it which it deserves. When Peas are wanted for exhibition they are not unfrequently gathered by a garden boy or by some such person, who takes no pains to gather them carefully. Gathering Peas for exhibition requires, comparatively speaking, as much care as cutting Grapes: but how seldom do they receive that attention! Only those who have some knowledge of the matter should be allowed to gather Peas for such a purpose. A pair of scissors should be used to cut off the pods, cutting them all with the same length of stalk, care being taken not to touch the pods, for fear of rubbing off the bloom. The pods should also be as nearly as possible of the same length, and equally well filled.

**Early Peas in Pots.**—Since so many excellent kinds of dwarf Peas have come into cultivation, many of them as early or nearly so as the taller-growing varieties, Peas are looked for much earlier than they were some years ago. Potting them, therefore, and placing them in pits, orchard-houses, etc., has now become a general practice, and we have seen Peas grown in this way produce good crops. Peas in pots should be grown stout and strong; if once allowed to become drawn they will prove anything but satisfactory. They should be raised in round flat pieces of turf cut according to the size of the pots in which they are to be grown, pricking in the Peas about 2½ in. or 3 in. apart, and placing them in any warm situation until they are up; an early Peach-house or Vinery answers the purpose perfectly, and if placed where the turf can get warm they come up quicker and stronger than they otherwise would do. As soon as they are up they should be placed in the lightest situation possible, close to the glass, where they will have the benefit of plenty of air whenever the weather is favourable. When they have attained a height of 5 in. or 6 in. they should be transferred to pots, the best size for the purpose being 8-in. or 10-in. ones; these will be found sufficiently large and yet not too large. Good drainage is absolutely necessary; and almost any good garden soil will do to pot them in, but the best is one-half good sandy turf chopped rather small, one-quarter well-rotted leaf-mould, and one-quarter good old cow-manure; if a little soot, too, be added, it will be found beneficial. In potting the soil will require to be made firm but not too hard, as the roots of Peas love to ramble in light rich soil; strict attention must be paid to watering, for if once the soil gets sodden the crop seldom comes to perfection. Sticking depends upon where they are grown: if in pits, a few small sticks will be necessary; but if on shelves in houses, a piece of cord strained from end to end for the haulm to rest on will answer the purpose better than anything else. When they show bloom they may be topped; this will greatly enhance the development of the pods. In selecting varieties for pot culture choose kinds that are dwarfest in habit and that produce the greatest amount of pods in the smallest space; quality must not, of course, be altogether overlooked, but in general it is of second-rate importance in very early Peas. Mr. Tillery, of Welbeck, recommends Blue Peter as being the most productive; Laxton's Unique is also said to be a good kind for pot culture; Early Gem is likewise a suitable Pea for this purpose; and there is a variety called Dwarf William the First, which is as good, perhaps, as most of the dwarf varieties, as it branches early and produces fine deep-green pods in great abundance. If, however, only one variety be grown, Blue Peter is the best; if a second one be needed, take Unique; and if a third, Dwarf William the First. These are undoubtedly the three best sorts for pot culture.

**Young Tops for Green Pea Soup.**—The tops of Peas are frequently used for flavouring soups, etc., in winter; where grown for that purpose, the seed should be sown in boxes or pans, and placed in any warm house or pit close to the glass. about six or seven weeks previous to their being wanted. They must be kept moderately moist, and when they have attained the height of 5 in. or 6 in. they will be fit for use. These, beaten through a sieve, make a fair soup; but, if mixed with dried Peas also passed through a sieve, it cannot be distinguished from genuine Green Pea soup. The strong-growing Marrows are the best kinds for this purpose, as they produce larger and better-flavoured tops than dwarf kinds. The more light, sun, and air they receive, the better their flavour. Sowings may also be made out of doors expressly for this purpose.

**Insects and Diseases.**—Slugs, snails, and an insect called the Pea weevil, are the principal enemies that attack the Pea whilst it is young. They are deposited in the ground, and as soon as the young plants show their heads above the surface, these destructive pests attack them. Soot is often used as a remedy, and it is doubtless effective in dry weather; but rain washes it all away, and it has to be frequently renewed until the amount of the soot injures the roots of the Peas. Wood and coal ashes are also used for keeping Pea enemies in check, and if spread thinly over the ground, they answer the purpose better than soot. There is also a maggot called Bruchus granarius, which gets inside the pods and spoils the Peas. For this the best remedy is to examine carefully the Peas while they are quite young, and remove all traces of the pest that can be found. Rats and mice often attack Peas, but of these two mice are the more destructive; they ferret the Peas out of the ground almost as soon as they are sown. Chopped Gorse sown in the rows with the Peas is recommended as a sure preventive. Rubbing the seed in red lead previous to sowing is also often done for the same purpose, but we have seen mice carry off the Peas, red lead and all. Paraffin mixed with Peas before planting is considered to be as effectual as anything that has yet been tried. The best way, however, is to catch the mice: this is sometimes done by sinking glazed vessels in the ground, and half-filling them with water, the edges of the vessel being rubbed over with grease; but the best trap with which we are acquainted consists of a common brick swung on a thread between two sticks, and baited with Peas. Get two small sticks about 6 in. long, push them in the ground about 2 in., and about 5 in. apart; then get a piece of cotton-thread with three or four Peas strung on it, tie this to the top of each stick, and on it rest the brick in a slanting direction, as is done in the old figure-of-4 trap. The mice will go under the brick, break the thread, and get crushed to death. Pullinger's Patent is said to be a good trap; it does not require setting or baiting after the first bait of Wheat or Rice has been placed in the receptacle, as the mice cannot get at it, and large numbers of them are caught by it in a very short time. Its price is 2s. 6d., which, as compared with that of other traps, is high, but with care it will last for years. Birds of various kinds are at times very destructive to Peas, especially after the pods are beginning to fill; we have frequently seen them attack the young plants as soon as they showed themselves above ground. This can be prevented by using common Pea-wires, or by means of strings of cotton tied to small sticks and allowed to move with the wind. An effectual plan is to soak the Peas in Bitter Aloes or Gentian—a decoction which will not in any way injure the growth of the Peas. Jackdaws and several of the finch tribe are terrible enemies to Peas—the former tearing the pods, haulm, and all, and making sad havoc in the rows; the finches prefer quietly extracting the Peas from the pods and leaving them empty. Long sticks, to which are attached pieces of white calico, will help to keep them away; but the most effectual remedy is a boy to frighten them off. Cats are sometimes employed in gardens, in which they are useful in scaring away both birds and mice. Of mildew little need be said; it is chiefly caused through want of moisture at the roots, and the best safeguards are deep trenching, heavy manuring, and copious watering. If under such circumstances it should appear, then dust the affected parts with flowers of sulphur.

**Pea Culture in Market Gardens.**—These are grown in the immediate neighbourhood of London; but the greater portion of the Peas that come to Covent Garden market in summer and autumn are grown in Bedfordshire, distant parts of Surrey, Kent, Essex, Hertfordshire, West Middlesex, Bucks, Berks, and other neighbouring and distant counties. The favourite sorts are difficult to name, on account of the partiality that different growers have for different kinds; certain it is, however, that the early dwarf kinds are universally the most desired, on account of their quick returns, the small space they occupy compared with tall Marrows, and because they require no stakes. Beck's Little Gem is much liked for an early crop, on account of its dwarf habit and good qualities. Other sorts, highly esteemed by market gardeners, are Early Frame, Croom's Dwarf, and Bishop's Dwarf. As a rule they are sown for a first crop in January, and invariably on a dryish soil and in as sheltered a place as possible, other sowings being made fortnightly in succession till April, or even till the 1st of July. In many instances the first sowing of Peas is made in December on a warm border; but, considering that they must be sown a little deeper than in January, and the risks to which the seeds are liable from mice, birds, insects, and damp, it is a much-disputed point amongst good growers whether the December sowing has any advantage over that made in January; whilst many contend that the produce of the latter is quite as early as that of the former, and the crop is less subject to risks. In making early sowings, it is a practice with market gardeners to choose a fine day to break down the ridges (the ground being previously manured and trenched), measure off the lines and draw the drills in the forenoon, and to leave them open till the afternoon, so that the soil in them may dry a little, and become thereby warmer; then to sow the seeds and cover all up before the evening. The drills vary from 2 ft. to 3½ ft. apart, according to the rankness or dwarfness of the sorts grown, and the object which the cultivator has in view. In the close lines, Lettuces or Spinach are used as intercrops, but in the more distant ones Cauliflower is the crop usually planted. Picking is often resorted to, and the more attention is paid to this, the longer will the Peas continue to bear. For seeding purposes the Peas in the rows are shifted once or twice from one side to the other, so as to preserve the pods from rotting with the damp and from being destroyed by snails, and to cause all to ripen alike and well. Laxton's William the First is a fine new early Pea for market purposes. It is of about the same height and habit as Sangster's No. 1, and equal to it in earliness; but the pods are larger, fuller, and as green as those of Prizetaker, the Peas also being deep-green. Multum in Parvo is also largely grown in many places as a market Pea with the best results, coming in, as it does, quite as early as Sangster's No. 1, but having larger pods, while the Peas are as delicious as Veitch's Perfection. It grows to a height of from 16 in. to 18 in., can be sown in rows 20 in. apart, wants no laying, and if cut with frost, as the early Peas often are, will send up a profuse second growth that will bear a heavy crop. Laxton's Omega will also, on account of the deep-green colour of its pods and Peas, become a favourite market Pea. It is a dwarf Ne Plus Ultra, but hardier and as good a cropper; the pods fill well, the Peas being still soft and juicy when the shells are full to bursting; it is a fine *dwarf late variety.*

## The Potato

*(Solanum tuberosum).*

THIS valuable and well-known esculent, now so widely cultivated, is a native of the mountainous parts of tropical America, and was taken to Spain and Italy by early adventurers in the sixteenth century, for we read of its cultivation in those countries in the year 1550. The usual size of the Potato in its wild state is rarely more than an inch in diameter, and the flavour very insipid and almost unpalatable. When first introduced into Europe it created some excitement of a similar character to that caused by the introduction of Tobacco and Coffee; for many years it was only to be found on the tables of the opulent, where it was used as a dessert either in the form of a sweetmeat or as a fruit. The first varieties grown in the United States were taken there from Europe. The quality was very poor, and not a variety then in use would at the present time be deemed fit for the table. It is only within a comparatively recent period that it has found its way into both continents as a general article of food for man and beast, or has received attention from cultivators. Many of our most practical and foremost gardeners are now directing their attention and energies to its improvement and propagation. In the year 1845, the disease known as the rot appeared, and nearly destroyed the whole crop. About this time a few persons, among others the late Mr. Goodrich, of Utica, imported a lot of the wild varieties directly from South America, and proceeded to raise seedlings by crossing with the various kinds then in use. Many thousand seedlings were thus produced, but few of them were ever brought to any state of perfection. One of the principal sorts saved was the Garnet Chili, which had a great reputation, and is the parent of many of our new sorts which are now attracting so much attention. Some fifty years ago, a cultivator who raised one hundred bushels of Potatoes was looked upon as having an enormous stock; while to-day, many growers in the vicinities of our large cities raise from ten to twenty thousand bushels, without exciting any unusual attention. Within this period nearly all the numerous varieties with which we are acquainted have been brought to notice, and every year adds its score of new seedlings to the already overgrown lists. Enormous quantities of Potatoes are now raised annually in this country, and the demand is always greater than the supply.

The following information, issued in the Potato catalogue of Messrs. Bliss & Sons, who have sent out so many new kinds, cannot fail to interest Potato growers:—The uses of this tuber are numerous, apart from their principal use as an article of food. Thousands of bushels are annually manufactured into starch, and alcohol is distilled from its juices. Even sugar has been made; but with so much competition in this line, it has never proved a great success. Too much cannot be said in favour of this valuable staple, and we shall endeavour to instruct our readers in these columns as to the methods used to increase the supply, without increasing the expense of its cultivation.

**Cultivation.**—The soil acknowledged to be the best for the Potato is a rich loam, sandy, and neither too wet nor too dry. A cool, moist soil will produce larger Potatoes, but the danger of too much wet is so great that a warmer soil is preferable in this climate. Early Potatoes reach their maturity sooner in a quick, light soil, and present a brighter and cleaner appearance than when dug from that which is heavier. A calcareous formation generally yields a sure crop. Old sod land, well turned under in the fall, and lightly ploughed and harrowed in the spring, will produce a sound crop, and often an astonishingly large one. Clover sod for this purpose is excellent, and furnishes a large amount of vegetable substance to the ground. When turned under in August or September it will rot by the following spring, and only a top-dressing of some well-established fertiliser will be required to carry through the crop. Wet land produces a coarse, unpalatable article, and one of little value even as food for cattle. Barn-yard manures are of little benefit to such land. Lands should never be ploughed while wet and heavy; it injures the soil, and does more harm than the manure can offset. Prepare the ground as carefully and thoroughly for Potatoes as for any other crop. Attention in this particular well repays the cultivator. Land intended for Potatoes requires but little manure, and that should be old and well rotted. By many, spreading the manure before ploughing in the spring is thought to be the best mode. At the time of planting, bone-dust, ashes, plaster, marl, and like fertilisers can be used to great advantage with this crop, as they are of a dry or absorbent nature. On wet soils they are very beneficial, as they prevent disease as well as promote the growth of the tubers. On warm, dry, light land, muck compost may advantageously be used; decayed leaves are excellent. In seasons of disease among Potatoes, fields where ashes have been used have suffered but little from the rot. Potatoes are usually planted in drills or hills, the latter being the more common method in this country. Some varieties require more space than others. For drills, 2½ ft. by 3 ft. is ample; while, when planted in hills, 3 ft. to 3½ ft. is the usual distance. The latter method has some advantages, as the cultivator or horse-hoe can be used both ways of the field. Some of the earlier varieties may be planted closer without loss to the crop. Cover about 4 in. in light soil, and not so deep in heavier. Cultivation should be commenced soon after the shoots appear above the ground, and weeds should be kept down with as much care as in a Carrot-bed. The earth should be drawn a little towards the hill at each hoeing, that the rootlets may gain strength and nutriment from the surrounding earth. When the blossoms appear, hoeing should be discontinued, and in fact is rarely necessary, as the stalks then cover the ground and discourage the growth of weeds. An excellent plan is to go over the field *occasionally* and remove carefully any weeds that appear in the hill, *for they draw largely* from the sustenance required for the developing tubers. Many farmers still continue to plant three to five eyes to the hill. In our opinion this is a mistake, and the last few years' experience confirms our views. Potatoes cut carefully to a single eye, the hills, perhaps, a trifle closer, will yield a larger crop than the careless way of throwing in seed by wholesale. We all know the effects of too close a growth of Carrots, Turnips, and such roots on the crop, and we think the same rule applies equally to Potatoes. Two good eyes to the hill, with a proper proportion of the flesh to each eye, will produce a far larger crop of merchantable tubers than two whole ones ; will yield from one-third to one-half more in weight—an item of no small consequence—to say nothing of the saving of nearly one-half the seed. Any good cultivator, who is up to the times, and reads the leading horticultural papers, will corroborate this statement. In order to secure an early crop, the seed must be planted as soon as the ground is in proper working order. This time differs in the various parts of our country, so that no set time can well be given. The earlier varieties can be marketed in sixty-five to seventy days from planting. A second crop can thus be planted, as described elsewhere, allowed to thoroughly mature, and thus have a good seed for another year, and a sound article of food for winter use. The yield of the first planting will give a handsome profit, for early Potatoes always command a high price when near a city or town. The later varieties do better when planted some weeks after the early kinds ; and the cultivator has this advantage—he can get the former well started and cultivated before he turns his labour and attention to the latter. A common method of forcing Potatoes is to select whole, sound tubers of some early variety of medium size, placing them close together in a moderately heated bed, composed of either light loam or partially decayed leaves. This should be done several weeks—say three or four—before the time of planting. By that time the tubers will have started sufficiently to be set out. Cut the Potatoes into pieces, as has been directed, and use care not to injure the young shoots. Plant 3 in. deep, applying a little horse-manure to the bottom of the hill, to afford warmth and to urge forward and nourish the young starting tubers. The decay of the tops indicates the maturity of the roots. The latter kinds often continue to grow till checked by autumn frosts. They should, however, be dug before the ground is touched by frost at night.

**Cutting the Sets.**—This is one of the most important subjects to be considered in the propagation of Potatoes, and there is such a diversity of opinion regarding the manner and method of cutting, that many pages could be filled in giving the different experiences of the professors in this art. While we do not attempt to decide this question to the satisfaction of every one, we shall give our own views, and claim that in our method an enormous quantity of the tubers now annually planted may be thrown into the market, causing a reduction in the prices charged for this common and necessary crop. Without discussing the respective merits of planting whole Potatoes, or half a dozen pieces, each piece containing three or four eyes, in a hill, we shall state, what has been proven by so many cultivators—that two good eyes are ample for one hill, and the yield of large, marketable Potatoes is larger than when more are planted. Take any Potato and hold it before you, with the stem end (the place where it was joined to the stalk) down. It will then be noticed that the eyes are arranged around the tuber in regular ascending rotation from the bottom to the top, similar to the thread of a corkscrew, each eye being a little above and further round the side than the one next below it. Now take the Potato in the left hand, with the stem end down, keeping it in a perpendicular position throughout the entire cutting. Take a sharp, thin-bladed knife, and remove the first eye, by placing the knife about equally distant between it and the eye next in rotation above it, sloping it to the indenture left by the stem, removing the flesh with it. When the first eye is removed, turn the Potato around in the hand until the next eye above appears. Remove this one in the same manner, and keep on turning the Potato, removing each eye as it appears in exact rotation, always sloping the knife to the stem. After three or four eyes are thus removed, each with its proportionate share of the flesh attached, the bottom part of the tuber will have a somewhat pyramidal form. After the first two eyes are removed, no further trouble will be found until the seed end is reached, and only a little extra care will be required to remove these closely clustered eyes. The base retains the same form throughout, and by sloping the knife each time, and cutting down to the apex of the inverted pyramid (which is the centre of the tuber), each eye will be supported by an equal amount of the flesh which is to start it into a strong, healthy growth. With common varieties, where seed is cheap, many will think this manner of cutting too troublesome; but if every cultivator should save one-half his seed, as he easily could do (for it will only require two barrels of sets for an acre, instead of four, as is usually planted, the increase being equal), thousands of bushels would annually be saved. But to those who wish to obtain a large increase from a small quantity of seed, as is necessary to those who buy the new and valuable varieties, this manner of cutting so that every eye is saved will prove invaluable.

**How to raise Potatoes from Cuttings.**—For this purpose any ordinary hotbed may be used. About the 1st of March take the Potatoes to be propagated, dividing them lengthwise, and laying these pieces with the cut side down upon the soil of the hotbed. Keep them perfectly dry until the top part has healed over and the sprouts have commenced to start. When the sprouts reach the height of 3 in. or 4 in., cut them off about ½ in. above the eye, and insert the ends of the cuttings thus obtained into the soil of the hotbed. Shade them from the sun, and water carefully until they are well rooted and the leaves begin to develop. The old pieces of the Potato will continue to throw up shoots to an almost incredible number, and these are all *to be removed,* as soon as strong enough, in the same manner as *the first ones.* In order to increase the crop still more, as soon as these cuttings have reached the height of 8 in. their tops may also be removed, and planted in the same manner as the slips from the Potato. As soon as the ground becomes warm and can be worked, prepare it as is usual in planting the tubers, and set out these young plants. It is best to transplant them on some cloudy day or towards evening, as the hot sun withers them and destroys many if planted in the hot part of the day. These plants will be found to grow very rapidly, and can be propagated indefinitely from cuttings of the older plants. No cuttings should be taken after the 1st of August, as they are liable to be destroyed by the cold weather before the crop is matured. The immense increase of stock by the use of this method may be illustrated as follows : a pound usually contains four medium-sized Potatoes, and there are from twelve to twenty eyes on each tuber. When cut and sprouted they will give at least five hundred plants. From each of these plants three cuttings may be taken, which gives a total of two thousand plants to be set in the ground. With the ordinary yield, each hill, at the lowest estimate, would give a pound and a half, or three thousand pounds; in all making about eighteen barrels of good, sound Potatoes, or a year's supply for a large family. We do not claim that this is either profitable or advisable with the common sorts of Potatoes; but with the many new and high-priced varieties which are now being disseminated at the prices of one, two, or three dollars a pound, it is almost invaluable, as for a slight expenditure a large stock may be obtained, paying to the propagator a thousandfold. This is no new experiment, but has been practised by the initiated for the last few years, and has ever proved a success. It is not confined to hotbeds, but many of our most prominent nurserymen have devoted whole greenhouses to this use, and we would confidently recommend it to our readers.

**Two Crops a Year.**—Take good sound early Potatoes, and cut them into single eyes, as described in the article on cutting. Allow these pieces to dry for a day or two, and then plant as early as the ground can be worked (a slight frost will not injure the Potato after being well planted). With ordinarily favourable weather the new crop of tubers will mature in from eight to ten weeks. As soon as they are ripe, dig them, and, after keeping them a day or two in some dry and warm place, proceed to cut them into single eyes, as before. Place the pieces thus obtained into pans or boxes containing dry plaster or gypsum. This absorbs the abundant moisture, which would otherwise greatly check the growth, if it did not destroy the sets entirely. Allow them to remain in the plaster for ten or twelve days, or until the eyes commence to start, when they are to be taken out and planted as before. In the latitude of New York this is only applicable to new varieties, like the famous Early Rose or Extra Early Vermont, which are of a quick growth and early maturity; but in many parts of the South, where the growing season is long, it may be practised indiscriminately upon all varieties. A gentleman raised two crops of Early Rose, a short time since, in this vicinity, yielding together an aggregate weight of 2,500 lb. He planted his pound, cut into single eyes, early in March, and dug his first crop about the middle of May. These were then treated as above described, and planted on the 10th of June, and the second crop dug the 1st of September. The yield from the one pound at the first digging was 50 lb.; and the second crop of this increase was 2,500 lb., or over forty bushels. This method is within the reach of all, and there is no extra expense incurred for hotbed sashes, or any other forcing requisites.

**How to Raise Seedlings.**—Save any well-ripened seed-balls from a good variety, and plant in early spring in well-drained boxes of sandy loam. Sow the seed on the surface, and sift fine soil over it to the depth of ¼ in. to ½ an in.; water sparingly, and, when the seedlings are 3 in. high, remove them from the seed-box without disturbing the earth around them more than is necessary, and plant in more roomy quarters. Many successful growers, however, prefer sowing the seed in open ground, when a partially shaded spot may be selected, and the seeds may be sown in drills about 10 in. apart; cover with ½ in. of soil. When the plants are strong enough, thin out or transplant, and keep down the weeds until the tubers ripen. Some few strong-growing varieties will form tubers weighing from 6 oz. to 8 oz. the first year. As a general rule they will be about the size of a Walnut. Store the tubers carefully until the next season, keeping them as cool as may be without freezing, when they may be planted in the same manner as any mature Potato. It usually takes three years to ascertain the true value of a seedling; and if a person is favoured by finding one really good variety among the many seedlings, he may feel well repaid for his time and trouble. Many new varieties are raised by hybridization, which is a more difficult method, although it generally secures a greater number of good varieties. The manner of procedure is as follows:—Remove all flowers excepting those you wish to hybridize, then with a pair of sharp scissors remove all the anthers from the stamens in the flowers to be impregnated, just before they commence to discharge their pollen. When the flowers are dry, shake the flower containing the stamens of the variety which you wish to cross with it, being careful to do it when they are ready to discharge their pollen. Fit a piece of fine netting over the impregnated flower, to prevent the bee and other insects from leaving the pollen of other varieties upon the exposed pistil. The covering may be removed after two or three days. Do not disturb them again until the seed-ball has become well ripened, when the treatment as given in the first part of this article may be applied. Instances have been known, though rare, where one Potato would produce two distinct sorts from its different buds or eyes. The white Peachblow, for example, has been found growing on the same stalk with the Jersey Peachblow. As so much interest is now excited in the growth and propagation of new seedlings, and many of the new varieties command such high prices —it behoves our cultivators and amateur gardeners to avail themselves of the latest and, by actual tests, the best method of producing new varieties.

**How to Store and Keep.**—It is a matter of no small importance to the cultivator to be able to keep his crop of Potatoes in good condition through our long winters, and to present them for sale, free from blemish or mildew, in the spring. A well-kept Potato brings three or four times the value in the market in early spring that the same stock will, if sold in the fall,—paying an extra profit over and above the cost of storing, handling and care required. Of the three methods of storing in general use each has its champions. They are—storing in barrels, bins, or heaps or pits. The advantage of placing in barrels is, they can be easily handled, do not suffer from abrasion, can be readily looked over, and if disease presents itself it can be checked or removed. When thousands of bushels are raised on one farm, this method cannot be followed, on account of the time and expense involved. Bins are largely used by our fore-handed cultivators, especially those near large cities, as the tubers can at any time be reached and got ready for market. A dry, cool, well-ventilated cellar, with the light excluded, is the best place to store Potatoes. It has been found very advantageous in preventing decay to sprinkle lime in the barrels or bin, at the rate, say, of 1 lb. to each barrel. It acts as an absorbent and neutralises the earthy odours, thus directly acting as a preventive of decay to the tubers. The importance of excluding light from Potatoes, and keeping them as cool as possible, cannot be overestimated as means of preserving the crop.

**Potato Culture at Woodstock.**—Mr. Robert Fenn, of Woodstock, has a mode of cultivation by which he annually secures crops that are second to none in the kingdom. Mr. Fenn dates his earliest experience in Potato culture back to a period some thirty years ago. At that time, writes Mr. Dean, in the *Garden*, our stock of Potatoes was an exceedingly limited one. There were few kinds in cultivation; and, with the first appearance of the Potato disease, it was difficult to create much interest in what might be new and improved kinds. There still exists much scepticism as to whether the best Potatoes of to-day are better than the best Potatoes of a generation or more since; but the best answer to that doubt is to be found in the fact that few persons have thought them worth preserving—for a list of the best Potatoes of the present day includes few that date back to a longer period than twelve years. Myatt's Ashleaf and the original Lapstone are still well favoured, and these are both kinds of high quality in their respective periods; but both have defects that render neither of them suitable main-crop Potatoes. To this list of improved kinds, Mr. Fenn has added a few good sorts, whilst his work as a raiser is not yet half done. The late Mr. Paterson, a famous Scotch Potato raiser, said, not long before his death, that his mantle would fall on Mr. Fenn's shoulders; and just as, in years past, Mr. Paterson gave us his Victoria, Scotch Blue, Princess Louise, and others, so has Mr. Fenn added Onward

Rector of Woodstock, Bountiful, and Early Market; and, in a few years, to these will be added others that will prove, without doubt, most worthy successors to the fine kinds already named.

**Manures and Ridge Culture.**—Growing up gradually at Woodstock has been the use of earth-closet manure and the ridge system of cultivation; in fact, Mr. Fenn can claim to have been almost the originator of the earth-closet system. Many years ago, and long before the patents of the present day had been heard of, Mr. Fenn had made widely known, in the pages of a contemporary, how he had worked out the plan, and how successful it had proved at the old Woodstock Rectory. Allied to this, also, was a plan for the saving and utilisation of all liquid sewage. Earth-closet manure would, from Mr. Fenn's experience, appear to be the very best form of Potato manure. It contains nothing of that moist coarseness so commonly associated with yard manure; added to which, if properly stored, it is fine in character, highly pulverised, dry, and full of potassium and those elements that build up good Potatoes. This excellent material is stored in tubs during the summer, and is perfectly deodorised, and in the winter is strewn liberally over the soil where the Potatoes are next to be grown, and well worked in with digging forks. The constant addition of this material during a long course of years has raised the soil several inches, and it is as open as an ash-bed. The Woodstock soil is naturally ill-favoured, as it has a deep substratum of limestone or stone-brash, and the pulverised soil on the surface presents the result of many years' constant labour in cultivation. As the ridge system of cultivation admits of the growth of a Winter Green crop between the Potato ridges, it is here that the liquid sewage is utilised, and to all the Brassica family it is very liberally administered during the growing season. As in the ridge arrangement, the Potato crop of next year will be planted just where the Green crop of this year is growing, so will the Potatoes partake of the enrichment the soil has received from this source, as also from the dry manure as before mentioned. The ridge system of cultivation involves the expenditure of more labour than is required on the old system of growth, but saves much good seed. Ordinarily, only one-half the number of tubers required to plant a given space of ground will be needed if the ridge system be adopted; with strong-growing kinds, the rows should be at least 4 ft. apart, and less robust kinds should have a width of not less than 3 ft. 6 in.

**Planting.**—The preparatory labour, as regards planting, includes the thorough working of the soil previously, with the addition of some form of manure and a good dressing of hot-slaked lime; then, at planting time, a shallow drill should be drawn with a hoe at the required distances, and when the sets have been laid therein, the work of covering in is performed with a fork, the soil being placed from between the rows immediately on each side of the tubers, so as to leave a shallow trough just over the sets. As the haulm increases in height more soil is added with the fork; and, as a finishing touch, a narrow shovel is run along the bed of the furrow, and the crumbs are put up neatly on either side, a perfect ridge being formed. As the haulm extends it will fall abroad, and the leave ridges exposed to the sun; and probably from this cause, as also from the highly pulverised nature of the soil, Mr. Fenn finds that his crops arrive at maturity at a much earlier period than those grown on the old flat system. To the elevated position of the ridge, and to the effect of this quickened growth, is probably to be attributed the fact that Mr. Fenn's crops escape almost altogether the attacks of the disease. Elevated ridges of soil, placed on a deeply-worked cool bottom, are much warmer than flatly laid soil. Moreover, in periods of great moisture, such as prevailed last July, and when the Potato crop is at a most critical stage, the ridge throws off much of the rainfall from the tubers, and the roots, being thus kept comparatively dry, are much less endangered than if growing on the flat system. It is a fact that during the past season Mr. Fenn has lifted remarkably clean crops of choice Potatoes, and the samples have been of the highest character; his losses from disease, out of about sixty bushels, did not exceed some six or seven bushels—a very small proportion indeed, in rich soil and with haulm robust and full of vigour.

**Varieties.**—Having already enumerated some of the kinds of Potatoes with which Mr. Fenn's name is associated, we may state that he still continues to raise seedlings which will no doubt eventually rank amongst the finest forms of the Potato. Amongst parent kinds, Mr. Fenn has used the Ashleaf, Coldstream, Shutford Seedling, and Turner's Union, as progenitors of his older sorts; then, to raise the present batch, he selected some of his own best kinds, crossing them with the Dawes' Matchless Kidney, and other kinds that promised to add size and whiteness of flesh to his own fine form and quality. The Woodstock Kidney, which constitutes the chief parent of the seedling Kidneys, was the product of a cross between Paterson's Victoria and the Fluke Kidney, so it will be observed that Mr. Fenn has operated upon a first-rate strain. The old Woodstock Kidney has, however, been withdrawn, and has given place to the seedling Woodstock Kidney, which is truly a grand variety. It might be classed as a late second-early, having a robust haulm, and being a heavy cropper, producing tubers remarkably smooth, handsome, and even in shape, long, flat, and straight, of first-rate table quality. This is a superb exhibition variety. The pollen parent of this kind was the Early White Kidney. A remarkably grand Potato is the International Kidney, so named in honour of the Potato exhibition held shortly after its introduction. This is the result of a cross between the old Woodstock Kidney and Dawes' Matchless. It is an immense cropper, producing very large but handsome white tubers.

**Paterson's Potatoes.**—The name of Paterson has become so closely linked to the Potato, that a generation must pass away ere it be forgotten, supposing that the descendants of the famous raiser of Dundee should cease sending out any more new varieties. It was the late Mr. Paterson's fortune to obtain more fame than money in repayment for his original outlay and trouble expended on Potato raising; but some of his fellow-citizens, not forgetful of the great efforts he had put forth in his endeavours to improve the breed of Potatoes, made him, in his later days, a handsome present, that must have carried with it some consolation for previous disappointments. Mr. Paterson's great desire was to secure a breed of Potatoes that possessed at once the merits of large croppers, good quality, and of great disease-resisting power; and, although time and circumstances have shown that this latter desideratum has not been secured, it will be admitted that his sorts are all good croppers—some of them very large ones—and that the larger portion of his kinds have the merit of fairly good quality. Few of them, however, can be classed as "garden" varieties, as they are characterised by a very robust growth, that requires the open field and an abundance of space for its full development; but few of them, also, are what is known in the south as early kinds—some of them that are, in northern parlance, termed "early," being as late in maturing here as kinds that we classify as late ones. That Paterson's kinds have obtained considerable favour in the north there can be but little doubt, as strong-growing and somewhat coarse-looking sorts seem to be chiefly grown down there; thus the Scotch Regents and Rocks, Rintoul's white and striped Dons, and Paterson's kinds are mostly grown, and seem to present to the northern grower the finest of first-class Potatoes. The sudden and extraordinary influx of American sorts of Potatoes into this country just at the moment that the Patersons were pushing the sale of their more recent seedlings must have considerably affected their sale, as thousands of persons readily gave a fancy price for the Yankee article without much reference to its table qualities, whilst better kinds offered to them at a cheap rate at their own doors were left to pine in the shadow of cold neglect. Without doubt the height of the American fever is now past; not one grower in twenty will say a good word for the Bresee's section, excepting one or two, in relation to their table qualities. And this deficiency is by no means made up by its large cropping qualities. It is, however, but fair to say, that in the matter of haulm and ripening most of the American sorts beat Paterson's. Indeed, the robust or rather coarse growth and lateness of ripening of the latter, have assisted not a little to stand in the way of their more general cultivation. Of all Paterson's kinds the best known amongst gardeners is Victoria, a capital variety; tubers flattish-round in shape, white-skinned, and of good table quality. It has an upright, robust haulm, and is late in ripening. This kind is largely cultivated for market purposes, and as a good late keeper, but is best suited for field growth. Perhaps one of the most praised Potatoes a year or two since was Paterson's Bovinia—a kind that has only been recommended for cattle food, and consequently does not come within the range of my observations. Farmers seem to be much taken with it, and no doubt for its special purpose it is a valuable acquisition. Mrs. Paterson, who succeeded to the management of her late husband's business last spring, offered a list of some twenty-two kinds, all of their own raising; but several of these being of later introduction, are put forward as improvements upon certain older seedlings, purposely to displace them, so that the list can be reduced in number with advantage. Thus, there is an improved Victoria or Queen Potato, that is a much heavier cropper than the old sort, and is, therefore, more worthy of general cultivation. The earliest sorts in the list, as I find them to be after two years' trial, are their New Early White Kidney, a true Ashleaf, much in growth and appearance like Lee's Hammersmith Kidney, and not quite so early as Royal Ashtop; and New Early Red Kidney, which again bears a close resemblance to Wonderful Red Kidney, being about as early, and producing tubers much like it in appearance. It is smoother and handsomer than Paterson's kinds generally, and is useful as an early coloured exhibition tuber. Following these comes Zebra, an early second-early kind, having haulms of moderate growth, and producing tubers of great size; in colour ground white streaked with red. Its quality, however, is certainly not before that of Bovinia. Early Perfection closely resembles the Regent in haulm, and in shape and colour of tuber,—whilst I find its prefix to be a misnomer, as it is with me one of the latest ripeners; nevertheless, it seems to be a good field variety. Perhaps the handsomest round tuber to be got out of the lot is to be found in Princess Lorne—a flattish-round, white kind, streaked with light purple about the eyes. It bears considerable resemblance to the old Wellington, but has a taller haulm and rather larger tubers. It is also a good cropper, and of excellent quality. Some of the largest tubers I have lifted came from Albert or Prince—a strong-growing late kind, and which produces large crops. The tubers are in colour purplish, streaked with white about the eyes; skin rough and netted: this will no doubt make a favourite sort. It does not require a rich soil, but plenty of room and deep tillage. Alexandra is a large late white kind, somewhat resembling Napoleon, which was originally sent out with Victoria, but seems not to have made any particular impression. British Queen is a red-skinned kind, that nearly resembles the old Red Regent, but has longer tubers. I think this kind is excelled for field purposes by the Red Skin Flour-ball. Paterson's New White Kidney is evidently a seedling of the Daine's Matchless section, as it bears the closest possible resemblence to that kind. It is a superior white Kidney fit for field culture, and produces immense crops. The Seedling Fluke turned out so badly with me that I have got rid of it. My last-mentioned sort is New Blue Kidney, elongated-round in shape, a large cropper, and having very white flesh. It is one of the latest ripeners of all the collection. Growers of large breadths for market will do well to give some of Paterson's newer sorts a trial, as in moderate soil they produce large tubers mostly of capital quality. Looked at with the eye of a connoisseur, it is evident that Paterson's seedlings cannot be expected to take any important position as garden varieties; they make too much haulm and have too coarse and deep-eyed tubers to suit the modern gardener, and can have but little chance on the exhibition table. Other raisers are making progressive steps in that direction; and may they meet with more present encouragement than in life fell to the lot of the persevering Paterson!

**Late Planting and Seed-preserving.**—Formerly, the end of June was the ordinary time for planting late Potatoes for winter use; and when St. Swithin brought round his annual watering-pot, the young roots and leaves were refreshed and benefited thereby, for at that stage moisture is necessary to the growth. Then the usual dry weather of August, September, and October (with occasional showers, chiefly beneficial about the end of August) assisted the development and maturity of the tubers, which (the haulm having safely died down) were lifted at leisure when more pressing operations were over, because no excess of rain can injure them after the skin is well set. Since the general rot, panic has introduced a totally different system. We plant late Potatoes, as well as early, in March; the season favouring, these latter sorts are almost ripe in July, when down comes the rain, as it always has done. The haulm is now drenched, blown about, and bruised; decay sets in, subsequent warmth develops insect life, mould may follow; and being, as is generally affirmed, struck all at once with blight, the tuber rots in consequence—the result being aggravated by the wet soil—and the crop is more or less spoiled. Possibly the seasons have also somewhat changed, and we have often more summer rain and wind than was formerly experienced. But, though this may be a reason for watching the season, and probably for taking special precaution to guard against excessive moisture, it surely affords no valid ground for changing the time of planting, as has been done; more especially as on the early plan, if the long days of midsummer prove dry, the Potatoes having ripened or set prematurely, without the haulm being decayed or checked by frost, any subsequent rainfall, being unable to expand the tubers, sets them off growing out, and spoils the crop in another way. When the tuber is more lately developed, and the haulm dies down, sprouting need no longer be feared. Such special precaution against excessive moisture as here recommended is taken by placing the seed upon instead of under the ground, and covering with a hoe from 4 in. to 6 in. high; 3 ft. 6 in. or 4 ft. between the rows will suffice. After the haulm appears, hoe up, from time to time, as high as the space will permit, when the ground between may be planted with winter crops. Cultivated on this plan, even if rain be excessive, the Potatoes may be kept drained; and then, though the haulm decays, the tubers do not. Such, at least, has been proved by experience. Nor is cutting off the haulm, as often recommended, of the slightest value. On the contrary, such a proceeding checks the growth of the healthy tubers, without in any manner saving those which are injured. Whenever heavy rain falls after the blossoming period, the crop may be saved by lifting at once, without waiting for appearance of disease; but the tubers will be unripe, small, and soapy. On the whole, it may be best to leave them to take their chance, whatever happens. This year, early sorts just pressed on the soft ground in rows 9 in. apart, and ridged up as above, were ripe somewhat earlier than others in the neighbourhood planted in the usual way under the ground surface. Late sorts put in at the end of June proved a failure in crop, because, in the particular locality, there was no rain at the usual time in July. Rain late in September brought extensive disease into the neighbourhood, many crops being entirely lost; whilst those on the above-ground plan suffered only to a limited extent from this cause. The haulm was injured; but, wherever any tubers were affected, they were near the top of the ridge, not sufficiently covered in, and therefore damp; and those not thus drenched by the wet were invariably sound. It should be stated, by way of warning, that it takes a couple of years, perhaps, to make the late planting fully answer; because tubers grown early one season may not be so vigorous when kept long enough for late planting the following year. The aim should be to get dry weather during the ripening month; therefore the time should be regulated by the average of seasons, which, as before indicated, will usually be rainy in July and dry in September. One cause of deterioration in the Potato plant itself may be the custom of exposing tubers for seed to the air, which turns them green, enables them to be kept longer without sprouting, and prevents worms and slugs from eating them when planted, because they are thus rendered poisonous. But if thus poisonous, surely the seed cannot be in a healthy state, and so well calculated to yield healthy produce as when sound; and if so, a continuation of a baneful practice from generation to generation must, one would think, materially deteriorate the power of the plant to resist other evil influences. Now it is not in any degree necessary to treat the seed tubers in this manner in order to prevent their sprouting before being planted. For twelve years seed Potatoes have been planted without having shot out more than was desirable,—and they have not been separated from the store for use,—all of which have been prevented from shooting by the simple expedient of keeping them cool in layers above ground, not exceeding 12 in. deep—in a store entered from an inner door, with 9-in. walls, battened with felt and board, which is quite sufficient to keep out frost. Every fifth layer of bricks projects inside, and on these offsets narrow boards slide so as to form shelves, as deep as may be required to keep each layer separate. There is, therefore, free ventilation between, aided by a hole a foot square at the top of one outer wall, closed by a shutter during frost. The top space, above which the outside ventilation is placed, is also roughly covered, affording another space underneath the tiles. In this store above ground, managed without straw, the Potatoes are kept without sprouting of any consequence, and perfectly sound, till the end of June, when early new sorts are ripe, and the late seed, preserved in the same way as those which have been eaten, are planted.

**Growing Potatoes for Exhibition.**—In growing Potatoes for exhibition, one of the first considerations is soil. Some soils will always grow Potatoes well,—such, for example, as a deep friable sandy-black loam, that is either naturally or artificially obtained,—but then such a soil as this is far from common, and therefore the cultivator has to make the best of that of which his garden consists. Into a soil that is naturally heavy, it is well to work a liberal dressing of long fresh stable manure, burying as much of the straw as possible. This should be dug in with a long-tined fork, and the soil should be as much broken as possible. After resting a few weeks, let the ground be marked out with a line in lengths of 3 ft. in width, and each length should be thrown into the ridge, the centre spit being turned over first, and the two side spits thrown up on to it. In this state it should lay until planting time, just prior to which, however, it will be well to add a dressing, a few inches in depth along each trench, of either rotten leaf-soil or of vegetable refuse from the rubbish heap. This should be well forked into the trench, in order that there may be a good depth of well-worked soil below the seed tubers. Still further, a good dressing of slaked lime one-half, soot one-quarter, and guano one-quarter, may be sown with advantage along each furrow, and be lightly pushed in when ready for planting. A shallow drill drawn with the hoe will be all the remaining preparation needed. Lime, newly slaked, and soot are important ingredients in the cultivation of show Potatoes, as they keep off wireworms and promote that smoothness and cleanness of skin so essential to a handsome Potato. If the soil be light, a good dressing of well-rotted manure should be worked into it in autumn, and in spring, just before planting, a dressing of lime (as just mentioned) should be applied all over the surface, and as planting proceeds this will be forked in, the lines in this case being, as before, not less than 3 ft. apart. As to sets, preference should be given to such as weigh about 3 oz. each, and they should be selected early in spring, and be laid out singly either on shelves or in shallow boxes exposed to the light, so that when they break the shoots may be strong and healthy. Shortly before planting, and when the strongest eyes have pushed into growth, the whole of the sets should be gone over, and have all their eyes gouged out with a sharp knife, excepting always the strongest,—as that alone is amply sufficient to produce a good crop, and the tubers will be larger than if three or four eyes are allowed to grow. As to planting, the second week in April is early enough. If the ground has been ridged it is simply necessary, as has been stated, to draw a shallow drill, place the sets firmly in it at intervals of about 15 in., and then lightly and carefully cover them with the finest soil from the sides of the ridges to a depth of about 5 in. Nothing more need be done until they are well through the ground, when the ridges between the rows should be again forked up, as it is only by constant working that a stiff stubborn soil can be brought into a good free tilth. Planting on the level light soil should be done in rows at the same intervals of 3 ft., using a fork to move the soil to a depth of about 6 in. Thus a shallow trench is opened across at one end of the piece to be planted about 1½ ft. from the edge, and a line being strained along it, the seed tubers are placed in it carefully, and the same width apart as before mentioned. The soil is then carefully forked over on to these, and the forking is continued until another width of 3 ft. is accomplished, when another line of sets should be planted as before, and so on until all are in the ground. Distinct kinds should be marked with a large label, to prevent any possible mistake. In both cases it is best to stir the soil around the haulm with a fork rather than with a hoe; the earthing-up, which should be done twice (an interval of two weeks being allowed to elapse between each operation), should also be done with the fork. Beyond keeping the ground free from weeds, little else is required; and if the sorts selected are good, and the season favourable, good crops ought to be the result.

When judging Potatoes, the preference is always given to the most even, smooth, and handsome-shaped tubers. Very large tubers are little thought of on an exhibition table, inasmuch as they are generally ugly in shape, compared with small or middle-sized tubers. The best way to store away Potatoes intended for show is as follows: When the crop is dug, which should be done carefully, the best should be selected and carefully washed, to prevent rubbing the skin off. They should then be laid for an hour in an airy place to dry, after which carefully wrap each one separately in tissue paper, and place them in a drawer or box where the air will be kept from them. When wanted for use they may be taken out and packed just as they are; and when the paper is taken off they will be found to be clean, smooth, and of good colour.

**American Potatoes in England.**—Taking these Potatoes as a whole, they are neither better nor worse than many of our own kinds, as regards the matter of cropping, and certainly inferior to our best sorts with respect to eating quality. As to their power to resist disease, an average of results as to immunity or otherwise shows without doubt that a majority of the American kinds have suffered less than a majority of English sorts have; but, as our kinds are higher bred and of improved quality, the reason that they suffer most is at once manifest. Still, it must be acknowledged that in thus possessing kinds (although of foreign introduction) that are of such comparatively healthy stocks, our gain has been considerable; and when the crops of certain favourite sorts run short, we are glad to have others to fall back upon. The most prominent kinds have been and still are a particular few, the most popular of which perhaps is Red-skin Flour-ball—a sort which was first sent out under the name of American Red. It has a large tuber, coarse in appearance, with deep eyes, and always produces a heavy crop. It should always be grown on light soil, not recently enriched with manure; and the produce should be kept over Christmas before eating, after which it will be at its best. To cottagers and persons who are not too fastidious, Flour-ball in bulk is during the winter a most acceptable store. The Early Rose, although a great cropper, proved to be of good cooking quality in such a small number of cases, and is so generally coarse and full of eyes, that it has greatly declined in popular estimation. Gleason's Late, a large flattish-long kind, having a white skin, covered with wide bands of bright red, and more recently introduced to the public under the name of Hundredfold Fluke, is a late variety, producing a heavy crop of large tubers, having flesh yellowish-white in colour, and moderately mealy when cooked. It is a capital keeper. On the whole, I consider this kind preferable to Flour-ball. Perhaps the best two of all the American sorts are Climax and Prolific. The first is a large, coarse, deep-eyed tuber, never handsome, but having very white flesh, and comes more closely to our Regent than any of the rest; the skin is roughly netted, and when cooked the flesh is mealy, and, if the tubers are not too large, cannot easily be distinguished from the Scotch Regents. It is a large cropper, and is not unlikely to become a favourite with some of our market growers. In the matter of crop and appearance my favourite is Prolific—a sort that, if grown in moderate soil, produces a large quantity of clean even tubers, somewhat pebble-shaped, having shallow eyes, and presenting altogether qualities that make it the most acceptable of the lot for exhibition. It keeps well, and even improves by keeping. The skin is of a brownish white, and the flesh is white. Late in the winter it cooks mealy and good. I heartily commend the cultivation of this kind to all who have not yet tried it. The Late Rose has been strongly commended as a good keeper, and of improved quality, but when it grows large it is full of deep eyes. It bears a close resemblance to the Early Rose, but the skin is rougher. I have mentioned but six sorts; there are, however, as many more kinds of American raising, but I believe I have pointed out the best. The family likeness that runs through them all is apparent, and American raisers would do well to import some of our choicest sorts in order to improve their own strains. If we hybridize in the same direction, Potato growers on both sides of the Atlantic will be mutual gainers.

**Home-raised Potatoes.**—After having given an unbiassed opinion respecting the American Potatoes, I beg to notice such British kinds as have possessed, or will yet possess, a higher reputation. No nation in the world can surpass us in the possession of good Potatoes, and these have been raised for us by those who have made Potato growing and improving the great object of their lives. Perchance in our eager search for quality, we may have lost some of that robustness which formerly characterised our Potatoes, and which is still characteristic of all new importations; but in that case gross growth has been exchanged for quality of the *tubers;* therefore the balance still remains greatly in our favour. *The least advance,* however, has been made in respect to that important section—the Early Kidneys. If any one can obtain a good strain of the old Ashleaf Kidney, I feel persuaded that they will produce crops as good and as satisfactory as will any of the more modern selections. Myatt's Kidney is strictly an Ashleaf, and is a great favourite with the market gardeners, because it is rather the best cropper; but Royal Ashleaf, which is identical with the Improved Ashleaf (and both are good strains of the old Ashleaf), is earlier and better for cooking when lifted, although, as a rule, the tubers are not quite so large. Alma, which is evidently a seedling, is an Ashleaf rather distinct in growth from the others, and one that can be highly recommended, as can also Lee's Hammersmith Kidney, which produces large tubers, and is a heavy cropper. Another new and evidently distinct kind is Early Ranelagh, a kidney of the Ashleaf type, but having a rough netted skin; it is one of the earliest kinds, a good cropper, and boils whiter than most others of this particular section. Some of the new kinds are of better quality than the old Ashleaf, but certainly in no case are they earlier, whilst their cropping qualities have not been sufficiently ascertained for a final decision either in favour of or against them. In this section considerable improvements are yet requisite, for we also want tubers that, when cooked, are white and floury like Dawes' Matchless, or we want the Lapstone engrafted on an Ashleaf growth, and with all its features of early ripening. Our best early round Potatoes are Turner's Union, a white-skinned kind, combining the earliness of the Shaw with some of the better qualities of the Regent; Scotch Blue, a very handsome-shaped tuber of excellent quality and the whitest of flesh; Onwards, one of Mr. M. Fenn's old seedlings, and a most delicious Potato; and Early Red Emperor, *alias* Main Crop, a red-skinned variety that is a great improvement upon the Fortyfold, and without exception the most handsome round Potato that we possess. Mr. Fenn, who occupies amongst Potatoes that position as a raiser which Mr. Laxton does amongst Peas, has now some new early kinds that promise to be great acquisitions to those who can appreciate high quality in Potatoes. In his Early White Kidney is presented one of the best and whitest of early sorts, and an excellent cropper. Amongst round Potatoes his Eliza Fenn and Early Market, with a few others, possess an excellence that must make them eagerly sought for; whilst his Rector of Woodstock, a new second-early round, extremely handsome and first-rate Potato, has already received high awards, and must eventually become a great favourite. In English Rose Mr. Fenn has a round and handsome kind, and his new red-skinned Kidney Bountiful is not only an immense cropper, but is, without exception, the most handsome red-skinned exhibition Kidney that can be found. The mention of these will sufficiently indicate what that gentleman is doing to promote Potato improvement; and when we remember what Bell & Thorpe, Paterson, Taylor, and others have done for the same cause, we have reason to rejoice that Potatoes are not likely to deteriorate in our hands. Second-early Kidneys present to the gardene possibly the most valuable section from which to select stocks for the main crop, and from these none are superior in all general excellence to Waterloo, Beaconsfield, an early Lapstone, Dawes' Matchless, Excelsior, King of Potatoes, King of Flukes, and President, all of which are heavy croppers and have handsome smooth tubers in which there is no waste, whilst their qualities, though of a high order, still differ enough to satisfy the most divergent tastes. They will, with ordinary care, keep until new Potatoes are ready for lifting in June.

**Late Sorts.**—I now propose to take a survey of the sorts of Potatoes commonly known as late kinds—*i.e.*, those that ripen late, and that, under good storage arrangements, keep sound and good until new Potatoes come in to take their place. In the first place, I will notice the best varieties raised and sent out by Paterson, of Dundee, who has deserved well of his country for his efforts to produce a robust, healthy race of Potatoes ; and in that he has been eminently successful, although, like too many enterprising men, he has gained more honour than profit. The Dundee varieties are all characterised by an exceedingly robust haulm, that amounts in many of them to coarseness ; and the majority are better adapted for field culture, where they can be planted in rows 2½ ft. apart, than for gardens, where space is limited and the whole of it has to be effectually utilised. Paterson is now offering a new early white kidney, that resembles our Ashleaf, but is not so early ; a new early red kidney, that inclines to be large and yellow-fleshed, but is scarcely early enough for our southern notions ; and two large round kinds,—viz., Zebra, a second-early, having purple stripes on the skin, and Early Perfection, a second-early, of the Regent type, and a good cropper, that promises to make a good London market Potato. The new White Kidney (not the early one) is a type of the Dawes' Matchless section, long and flat, but probably not superior to that old variety. New Blue Kidney is rather an elongated roundish-shaped one, somewhat coarse in appearance, but evidently a great cropper. And last, but not least, is a batch of "Royal" rounds, with white, red, and purple skins, including the popular Victoria, Albert, Alexandra, British Queen, and Princess of Lorne, all of which are strong growers, large croppers, having white flesh, and are also late keepers. The reason why so few of Paterson's Potatoes are cultivated in the south, is probably due to the fact that Dundee is too far north for purchasing small quantities to be profitable. Still, out of a dozen of Paterson's kinds, some certainly will prove established favourites, and eventually repay the first cost,—which I can testify, as last year I grew them all, and intend giving them a better trial this year again. Our latest kidneys, and without doubt our best keepers, are the Lapstone race, of which I could mention at least a dozen named kinds.

There is much talk and writing, especially at the times when the disease is prevalent, about the degeneracy of the Potato ; but in such I have no reliance, for I have grown for several years a stock of the true original Cobbler's Lapstone, sent out some two-and-twenty years ago, and it is still as good, in every sense, as any of its more youthful compeers. One of the best of the Lapstones is Yorkshire Hero, a remarkably dry, mealy tuber, of great excellence, and a famous keeper ; but if I mention at once such varieties as Pebble White, Headley's Nonpareil, Daintree's Kidney, Brixton Pippin, Troughton's Incomparable, and Preston Prizetaker, it becomes evident that the Lapstone family are all good, and yield a produce that will satisfy the most fastidious. Of late red kidneys that are in much request for exhibition purposes, I recommend Red Fluke and Cottager's Red Kidney, the latter being an enormous cropper, rather yellow-fleshed, but a capital tuber for eating, and a grand help to the cottager if he has as many sacks of them in his store as he usually has heads in his family.

Amongst round late kinds, I can recommend none more heartily than Purple Regent, an excellent keeping sort. The skin is thin, and the flesh almost as white as snow ; and being a good cropper it stands in the foremost rank amongst our most useful table Potatoes. Wellington has somewhat flattened, roundish tubers, and red blotched eyes ; and the Red Breadfruit is an entirely red form of this variety, but it seems to be a rather better cropper. Both of these have short, spreading haulms, and do not require so much growing space as coarser kinds, and they are also useful sorts for exhibition.

**The Quality of Potatoes.**—The conflicting accounts which are constantly published of the merits of various kinds of Potatoes must often prove puzzling to those who forget that Potatoes depend very materially for their qualities upon the nature of the soil in which they are grown. It may be said of many kinds that, whilst in some parts they are of the best quality, in other places they are close and flavourless. A knowledge of this has made me very chary of giving an adverse opinion of any tolerably good kind ; but there are some of which it would be impossible to say that they were good anywhere. There are kinds that have been, as it were, forced into the market by various methods, but, having universally proved to be inferior in quality, are quietly falling out of cultivation. Some of the most recently introduced American kinds ought never to have been heard of. Eureka, for instance, a variety that is as coarse and deep-eyed as the Bovina, is literally a disgrace to any garden. Alpha also, although early and of fair quality, has no constitution, and not a good sample of it has been seen this season. As a first early it is, in the matter of bulk and quality, considerably behind our best kinds. This is not merely my own opinion, but the result of inquiries made from growers in all parts of the country. On the other hand, Snowflake, as was evidenced at the recent show at the Alexandra Palace, is the most popular of all the American kinds, and bids fair to become a standard variety. Remarkably fine samples of the very handsome red kidney Bountiful were also freely staged at the show. To show that it has constitution, it is enough to say that the finest samples staged and the premier dish of coloured kidneys in the show were in Mr. Donaldson's collection, and were grown as far north as Inverary. One of the best samples of a white round Potato was a dish of Onwards: in fact, this Potato, of which I thought poorly a few years since, has now developed fine form, and produced a large crop. So much for the variable results obtained in the culture of Potatoes.—*A.D.*

Mr. James Taplin writes respecting English *v.* American Potatoes in the following terms:—"Several articles have appeared in English gardening periodicals on this subject, all viewing the question in an English light; perhaps a few notes, therefore, from an American point of view may not be uninteresting. When the dollar-per-pound Potatoes were talked and written about, probably English speculators expected to 'strike ile' by investing in some, and would naturally praise their new investment, in order to induce English gardeners to take up the novelty. Doubtless many were disappointed, but the same would occur if we depended on the English varieties in this country. My experience confirms the fact that no crop varies so much under different soils and climates as the Potato; but as a rule, on warm open soils, the quality is superior to that of those grown on cold, stiff land, and there is also greater freedom from disease. A case in point is the kitchen garden at Chatsworth, Potatoes grown in which were poor in quality, the soil being low and cold, but when grown on hotbeds under glass, the quality was so good that I was requested to send all I had for the family table in London. The garden at Teddesley Park had a light warm soil, naturally drained, and the Potatoes grown in it were invariably fine and excellent in quality. What, however, an Englishman would consider to be a first-rate Potato is not to be obtained in this country, although those grown on the light, sandy soil of New Jersey are much above the average; but we can grow first-rate Sweet Potatoes—a luxury not to be obtained in the cold, damp climate of England. I obtained a few tubers from England of a number of the most popular varieties of Potatoes, including several of Paterson's Seedlings, Red Flour-ball, Racehorse, and Rivers' Ash-leaved Kidney, but from the first it was evident that they were not a success; the growth was weak and poor, and, when taken up, the tubers were small in size and number. When cooked, the Ash-leaved were better than any other Potato I have tasted here, and I intend trying them again, for we have no very early variety, and the Ash-leaved is at least a fortnight earlier than Early Rose; the other varieties were an indifferent crop, and not good when cooked,—the Flour-ball being the best, and Racehorse the worst. I gave them two years' trial. We find the Early Rose good in quality here, but from stiff land it is very bad, which accounts for the various opinions expressed by correspondents respecting it: and I have found other varieties just the same. I may say, however, that the Early Rose was a great acquisition for this country, but I never expected it to supersede, or even compete with, the many first-rate varieties already grown in England."

***New Potatoes at Christmas***—Mr. Gilbert says:—"For many years past I have always managed to have a few new Potatoes for Christmas. This I effected some twenty years ago by saving a few old tubers until September, when they more resembled pieces of sponge than Potatoes. I then placed them in layers among damp leaf-soil, when they threw out Potatoes from the eyes, instead of foliage, but the Potatoes were anything but good. After that I planted outside in July, covered up with long litter when frost set in, and dug Potatoes from open quarters; but I must admit that the disease often caught us napping. For these six years past, however, I have pursued the following plan, and have always had new Potatoes in abundance at Christmas. After I get clear of early Melons, I dig up the soil and mix it with leaf-mould, and plant old seed saved from last year—the best variety for the purpose being the Lapstone. I place the lights on the pit, tilting up both ends with bricks, so as to allow a free circulation of air. I give only one good watering, and the result is new Potatoes equal in size and flavour to those grown naturally outside. When the tops die off, I cover the haulm with dry litter and replace the lights, to keep out frost."

**Potatoes in Early Spring.**—The Potato is undoubtedly one of the most welcome of early vegetables, and a dish of young Potatoes in March or April is by many highly appreciated; but Potatoes are comparatively useless before the middle or end of March, excepting as a novelty. Great pains are sometimes taken to secure a dish or two before that time, by growing the Potatoes in pots in hothouses, but they do not repay the trouble they require. The Potato is very easily forced into growth, but unless the culture is conducted with some attention, very little crop, if any, is likely to result. Hence it is rarely forced, even in large establishments, being considered not worth the trouble on a large scale. This is a mistake, however. Apart from the gratification of having them on the table, they may be forced early in sufficient quantity to pay for the outlay in any private establishment. To do more than this, the frames in which they are grown must be utilised in another manner after the Potatoes are over. It is perfectly hopeless attempting to force the Potato early unless the foliage can be exposed to the greatest amount of light possible, and the necessary temperature be maintained. First, a few words about the Potato pit, which should be a brick structure, 7 ft. wide and 5 ft. deep at the back, and of any length required. This depth will allow of 3 ft. of pit for a hotbed of leaves, which will be necessary for the earliest crops; and half the brickwork may, of course, be below the ground level. A 3-in. hot-water pipe, taken along the back of the pit and round the front, will be ample heating power. The brick walls should be 9 in. thick, but the back wall may be "set off," within 15 in. of the top, to half a brick, which will be sufficient for the framework to rest upon; and the ledge so formed inside will be highly useful for Strawberries in pots, or bedding stuff, etc. Such pits can be built cheaply, and the sashes and excellent substantial framing can now be bought, painted and glazed with 21-oz.

glass in readiness for fixing, at a cheap rate. After the Potatoes are over in April and May, a quantity of Tomato plants, which have been sown in February and pushed on to big plants elsewhere, may be planted in the frames and trained over the bed—a few old Pea sticks being laid under them to keep the fruit off the ground. From June till November enormous crops may be got from these plants, with a little attention. There is always a ready market for Tomatoes, and they fetch readily from 4d. to 6d. per pound in the market. This crop will therefore quite repay those to whom the Potato frame is a question of expense. If the frames be not otherwise needed during summer, sufficient Tomatoes may be grown in them to defray all expenses. Presuming the first crop has to be ready towards the end of March, it should be planted about the end of December, and, with this object, 3 ft. of leaves should be put into the pit a week or two before, and allowed to settle, after having been trodden hard when put in. It is not desirable that the bottom-heat should be above 65° or 70°; if higher than this, it forces the Potatoes unduly during the dull winter months, and no tubers are formed worth speaking of. For this reason a hotbed is not required at all for the second crop—planted in February to be ready by May—and it is generally the best. At that season, if the top-heat be properly maintained, sufficient heat will be imparted to the soil to promote a healthy growth; 9 in. of soil—light, loamy, spent soil, from an old Melon or Cucumber bed, will do well—should be laid on the leaves when they have settled sufficiently, or it may at once be thrown into little ridges with the hand, 7 in. deep and 18 in. apart, the ridges to run across the bed, supposing the pit to face south. The object of the ridges is to save earthing up the Potatoes, or top-dressing, when they have grown, which cannot be done without abusing the tender stems. The sets are planted in the furrows so formed, and barely covered at first, and after the stems have grown about 1 ft., the ridges are levelled in about them, which can be done easily and expeditiously with the hand. The Potato, when forced, is very apt to form tubers near the surface of the soil, consequently moulding-up in some way must be done to prevent the best tubers from greening. Indeed, it is found necessary, sometimes, to top-dress as well, when the stems are growing vigorously just as the tubers are forming. Mona's Pride and the common Ashleaf are best adapted for the purpose, as they make short tops—an important consideration in forcing. The Royal Ashleaf is too luxuriant a grower. The first-named is the best for the earliest dishes, as it gets to a useful size soon; but the common Ashleaf is best for the main crop. Some advise saving seed from the earliest crops for forcing; but this is not of much consequence with crops planted in December. The Potato starts easily into leaf, after which the stem depends upon its own proper roots for sustenance, and the chief object then is to secure a quantity of good healthy foliage; weedy stems crowded thickly together will never yield decent-sized tubers. Select sound tubers, of fair size, a short time before the pit is got ready for planting, lay them closely together in a shallow box, and cover them with about ½ in. of soil. They may be started in any house or pit where the temperature is about 60°, giving them scarcely any water at this stage. As soon as they have grown about 1 in., all the buds should be rubbed clean off but one strong one, and the sets finally planted in the bed, in the bottom of the little furrows before described, 6 in. apart, with the bud end of the sets all lying one way. They are then barely covered with soil, and planting is done; no water is given at this stage either. In this way may be got twelve or thirteen sets into a row, in a pit of 6 ft. or 7 ft. wide, and each row should give at least one good dish of Potatoes. If the single-stem system be adhered to, each root should yield three or four good-sized Potatoes and some small ones. Avoid crowding the shoots. A good stout stem with a head of broad healthy leaves always indicates large tubers. A small stake should be put to the stems, to keep them from falling down; when standing up erect to the light they receive its full benefit, and this is everything so early in the season. Little or no water should be given from the time they are planted till the Potatoes are fit to get in, unless it be near the pipes, where the soil is apt to get dry; the stems damp off readily if too much water be given, and, besides, the Potatoes are not good to eat. A night temperature of from 60° to 65° is quite high enough, and an abatement of 5° may be made in these figures in cold weather. On bright days it may run up to 75° or 80° with safety, but always with a free circulation of air. The usual custom of ventilating only at the back of the frame is bad practice, as the plants placed there are much retarded, if not starved, by doing so, while those near the front pipes are roasted. Ventilate at the front by pulling the sashes up 2 in. or 3 in., which allows the air to rush in over the front pipe, getting warmed by the contact before entering the pit, and, passing over the Potatoes, it escapes out between the glass and the wall-plate at the back frames. Ventilation in this way ensures a more regular temperature throughout the structure, and cold draughts, such as result from opening the sashes widely at the back only, are completely avoided. When the crop is almost fit to get in, the pit should be kept dry, airy, and warm, though nothing like ripening the plants need be attempted. The object is to get good tubers fit for use as soon as possible; and, if they have been grown as here directed, rather on the dry side, they will, when large enough, be ready for table. To have the second crop fit for use in May, plant in February; the treatment is just the same, excepting that it is not necessary to use leaves for bottom-heat. By the above plan, Potatoes may be had when desired, independently of the weather. It is not, however, absolutely necessary to go to the expense of building brick pits and heating apparatus for Potato growing; but to attempt to have them as early as March or April, with the aid of fermenting material alone, involves much labour and expense, and the results are at the best uncertain. Still, with the simple leaf hotbed and wooden frames, they can be a long while before the earliest crops out of doors are ready. Frames suitable for this purpose can now be bought at a cheap rate, and they are very handy during the summer for many things, and can be easily moved from place to place. They are also well adapted for small gardens, inasmuch as, being portable, they are of course the property of the tenant. For Potato forcing these frames should be placed on a leaf or manure bed, and it is a good plan to thatch them with straw outside, which will save much trouble in frosty weather. This operation can be quickly performed, by getting a bundle of clean Wheat-straw and tucking it round the outside of the frame with two or three lines of tar-band, hooking the band round a nail about every 2 ft. as you go on, and afterwards cutting the straw square off with a knife, level with the top of the frames. In such frames the Potatoes may be planted in February, after starting as before advised, and brought on as fast as the weather and economized sun-heat will permit; or the Potatoes may be forwarded in 5-in. pots and planted out early in March. When forwarded in this way, until they get 6 in. or 7 in. high they must be kept growing by close attention to hot linings applied to the sides of the frame, and by shutting up early in the afternoon, so as to make the most of the sun-heat. Water must be given sparingly. As the Potato stems get almost in contact with the glass, soon after planting, and are consequently apt to get caught by the frost, care must be taken to cover the sashes with dry light litter or mats, whenever there is any appearance of frost. A very thin sprinkling of dry straw will keep out more frost than any kind of cloth covering, being one of the best non-conductors. If it be desirable to have Potatoes fit for use out of doors early enough to succeed those grown in frames, a quantity of seed should be forwarded in pots or pans, and planted out when they are 4 in. or 5 in. high, about the first week in April—always having dry straw at hand, to cover with in case of frost.—*J. S.*

**Potato Culture in Market Gardens.**—London market gardeners only grow early sorts of Potatoes for sale—late kinds, if any are grown, being only for private use. The varieties which they cultivate for market consist chiefly of Ashleafs, particularly Myatt's, Lapstone Kidney, Dalmahoy, Regents, and similar kinds. Young Potatoes from Nice appear in our markets soon after New Year's day, and shortly afterwards they are supplied from Algiers and the south of France. These early Potatoes, which are not of the best quality, are sold in 1 lb. punnets at from 1s. 6d. to 8s. per punnet, according to their quality and the earliness of the season. About Christmas and New Year's day may be also observed in fruiterers' windows, little punnets of what are termed new Potatoes, which may be bought for 1s. and 1s. 6d. per punnet; these are the produce of tubers kept from sprouting till July, when they are planted. Haulm soon afterwards appears and tubers are formed; but the frost overtakes them long before the latter become firm or ripe; the haulm is then cleared off, and the ground is mulched with litter; about Christmas time these immature Potatoes are dug up, and after being steeped in water in order to soften them, they are exposed for sale labelled "New Potatoes." The ground selected for Potatoes, if an open quarter, is usually the driest and lightest at command, as in such soils the crop comes to maturity sooner than it otherwise would do, and tubers raised in such soils are of the best quality. Mr. Myatt, of Deptford, a great grower of Potatoes, plants them in rows 2 ft. apart, the ground being previously manured and trenched, and levelled down with the plough. Planting takes place as soon after the middle of February as time and convenience will permit. Mr. Jessop, of Chiswick, on whose ground I have seen splendid Dalmahoy Potatoes, plants in drills 2½ ft. apart, and about 18 in. set from set in the rows; and, being planted in March, they are in excellent condition for use in August and September. Mr. Dancer, of Little Sutton, and others, plant two rows of Potatoes between their lines of Gooseberry and Currant bushes, which are 6 ft. apart, and partially under the shade of large fruit trees; and when fruit bushes do not occupy this position the Potatoes are planted in continuous rows about 2½ ft. apart, just as they would be in open fields. Some market gardeners loosen the soil between the rows of their spring Cabbages in March with a steel fork—*i.e.*, if the ground have not been trenched before planting it with the Cabbages—and therein plant Potato sets with a dibble. When the Potatoes appear above ground the Cabbages are removed for market, therefore little or no injury happens to either crop; and, as soon as the Potatoes get up a little and some earth is drawn to them with a hoe, the intervening space, if hard, is loosened with a fork, and again planted with Brussels Sprouts or early sprouting Broccoli. Before these can do much injury to the Potatoes, the latter will be ripe, when they may be lifted at once for market, or kept for seed or home consumption. In cases in which Potatoes are grown in the open fields, a crop of Lettuces may be got from between them; but after these are removed it is not considered advisable to plant anything else, particularly if the crop is to be sent to market. No sooner are the tubers all lifted, than the haulm is collected and carted to the manure heap; and the ground is then manured, or not, according to circumstances, and ploughed or dug over, when it is ready for Cabbage sowing, Colewort planting, Leek transplanting, or for sowing with winter Onions; or it is used for Spinach, Radishes, Turnips, or late Celery. The summer culture consists in merely hoeing and keeping the crop rigidly clean. Potato crops are always earthed up—an operation which is done by means of broad iron hoes or double-moulded horse-ploughs; and they are, as a rule, lifted with forks, but sometimes by the plough, which performs the task more expeditiously. The tubers being collected and sized, are put into bushel and half-bushel baskets and are covered with haulm, which is held in its place by means of a few twigs of Hazel. These baskets are then piled one above the other on waggons, and sent to market.

**How Early Potatoes are grown in Lancashire.**—In this part of the country whole parishes are occupied in growing early Potatoes, in a manner scarcely known elsewhere, and certainly worthy of imitation where this vegetable is largely required. Cottagers, large and small farmers, and nearly every occupier of land, have more or less to do with their production; and there are cases when as much as £70 has been offered for the early Potatoes growing in a cottage garden, on a piece of land that would not support a cow; and some of the growers have about a quarter of a mile, or upwards, of pits for the purpose (they are grown in pits). The affair must therefore be considered important,—so much so, that one may wonder that the custom is so local. Perhaps the fact that the neighbourhood where these early Potatoes are grown closely adjoins the district where the Potato was first cultivated in England may render the subject more interesting. The early Potatoes are grown in turf pits, covered with straw screens that are made in a peculiar manner. Let a carpenter make a strong frame, 6 ft. by 4 ft., which shall, when shut, resemble a monster kind of book-cover in two parts, which are hinged together strongly at the back, and fastened with hooks and staples where the book-clasps would be. The pieces forming the back, where the hinges are placed, and the front, where the bolts are used, should be of Oak, 2½ in. thick, and 6 in. wide. A piece at each end, and two in the middle, also of Oak or Ash, 1 in. thick, are let into the pieces forming back and front, leaving between the "boards" a space 3 in. deep, which is intended to contain the material of the screen, or what would be the letter-press of a volume. Procure two trestles on which to place the frame—each trestle, when in position, having a post, or stout piece of wood, 6 ft. high, let firmly into the ground at its end. When the frame is laid on the trestles, one part is turned up and fastened to the posts. On the part of the screen that lies on the trestles, prepared pieces of tough branches of wood, such as Hazel, Oak, dead Spruce, Larch, or any durable young wood, are laid, and on the toughness of the brush employed depends the durability of the screen. Such spray as that of Beech, Elder, etc., is of no use, as it only lasts one season, and when the wood is worn out the screen is comparatively useless. Now place on the wood long Wheat-straw, to the thickness of about an inch, equalising it over the whole frame, and making both ends full. More branches of a stronger kind are then laid on, keeping some of the straighter pieces for the outsides, and using three strong pieces crossways, to give strength. It is this middle enclosed brushwood that gives a firmness to the whole, and makes the screen as solid as a table-top. Add another layer of straw as before, on which place some of the flatter and lighter pieces of spray, as at first. Now bring down the turned-up part of the frame, and bolt together. Some amount of pressure will be required, owing to the mass of straw and wood employed, but this gives firmness to the screen. Turn the whole of the screen up to the two posts, to which it is fastened at the top, the lower part still resting on the trestles. Tarred twine must now be in readiness, with two needles made of hard Oak, 1 ft. long, with perforated eyes; and a man on either side of the screen passes them through in three or five places, exchanging needles at every stitch—thus forming a kind of brace-stitch. When this operation has been completed, twist off the ends of the brush and straw flush with the ends of the frame, and you have the screen completed. Although these appliances are chiefly used for early Potato growing, they are amongst the most useful articles in a garden. Placed at an angle of 45° over Celery rows, they would effectually protect them from wet and snow. Round early-made hotbeds they are also invaluable. Supported on bricks over Parsley-beds they afford protection in all weathers, and neither staking nor nailing down will be required. Early Vine borders may be thatched over with them, and three or more placed around shrubs will afford them a neat and efficient protection. Many other uses will suggest themselves. Temporary pits to any extent may be made with them; or, by laying them end to end, tied to stakes, they furnish capital places for hardening-off bedding plants. They can be made by any labourer; and stowed away, when dry, under a shed, will last for years. Where used extensively by the Potato growers they are made into stacks and slightly thatched over till wanted. We will now endeavour to explain the method of raising the Potatoes. These are grown in pits made of turf. The best and most sheltered situations adjacent to the dwellings of the growers are chosen; a good thick high hedge running east and west is a good site, or a sheltered piece of land is often wholly occupied by a series of pits running parallel to each other; in short, naturally warm places are always chosen, and if they do not exist they are artificially made so. The pits are constructed of any required length from the sods on the place. The walls are 1 ft. thick, 1 ft. high at the back and front, and 4 ft. high at the ends or gable; they are about 8 ft. wide; a slight rail, answering to the ridge tile of a building, runs the whole length, supported, where necessary, by upright pieces, which, of course, run down the centre of the pit. A more slender rail, or even tar twine fastened to upright sticks, runs parallel with the ridge piece, midway between it and the walls, both at the back and front. Of course a slight rail is preferable to the twine, where obtainable. The use of the latter is to prevent the screen (one end, of course, resting on the wall and the other on the ridge piece) from swagging downwards with the weight of wet or snow. We will now suppose the pit to contain a sufficient quantity of highly manured soil, and to be ready for planting. The most important item, however, in the whole affair is the preparation of the sets, and this is peculiar and totally at variance with the directions usually given for the sprouting process of growing early Potatoes. The system generally advocated is to push the set into growth only for 2 in. or 3 in., and then by exposure to green the sprout. In the method we are now endeavouring to describe the main point is to keep them white and tender, just as they would be when buried in the soil; and the theory is, that this is effected by keeping the sprout continually growing from the first. Any greening or hardening is considered detrimental and waste of time. On consideration, it will be evident that a Potato sprout that is greened and hardened before planting must become blanched and softened before it commences to grow. Laying down —that is, putting the Potatoes to sprout—commences about Christmas Day. A hay loft or barn floor, or any spare room, is used for this purpose. Selected medium-sized whole Potatoes are used, and placed as close together as they can be packed singly. Bricks or pieces of wood are placed at convenient distances as the Potatoes are laid down, serving as alleys. On these, slight slips of wood are placed over the sets, and the whole is covered over with stout paper, such as old newspapers, etc. This is done to exclude light and air, and acts as a kind of forcing process with the Potato. Hay or litter is placed over the paper in frosty weather. This method is a rather dangerous one in hard frost, especially in such winters as we are sometimes obliged to pass through. A modification of it, certainly to be preferred for general purposes, is to use light-made boxes 9 in. deep, 4 ft. long, and 2 ft. wide, with no tops. These are filled with Potatoes, as on the floors, and are piled one on the other in any convenient place. Being all of one size, the bottom of one serves as the top to the other. Old Orange boxes are well adapted for this purpose, and do well where they can be had. The sets, by this method, can easily be protected from frost, as, in extreme weather, they can be carried anywhere: they are sometimes put in rooms under beds. Planting time commences on Valentine's Day, the screens having been placed on the beds a few days previously to keep the soil dry, and the sets are uncovered on the floors or in the boxes for about three days, to give the sprouts a certain firmness. They are cut up as planted, each set having one good sprout about 6 in. long. Scrupulous care is taken to reject every sprout with a hard or black point. Holes are made all over the bed, 9 in. every way, with a kind of dibble shod with iron, which, owing to a cross-piece, can only make the hole the required depth. One Potato is placed in each hole, and then the whole pit is raked carefully over with a wooden rake, or hay rake, which, as the sprouts are barely half an inch below the surface, does not break the points. The back screens are then put on from end to end, the ends on the ridge being kept true to each other, so that the front screens when put on form a good lap on the back ones. The work as far as planting goes is now done, and as the Potatoes have had no check they are up directly. The front screens are taken off every warm sunny day that comes, and put on early in the afternoon, always according to the weather,—and now the care begins. No sunny day must be lost, and a frosty hour would be fatal. It would be useless for any one to attempt growing Potatoes largely on this plan except they can afford to have some person nearly always with them. Small farmers, or cottagers, with stout lads or lasses, generally follow it. A ton of screens to lift off in the morning and put on again in the evening is labour, and those who cannot afford cheap labour do not attempt it. The back screens are seldom taken off until the Potatoes are far advanced, or when rain would be beneficial; and the front ones, when taken off, are laid down sideways, tile fashion, but always below the level of the front wall, so that a single ray shall not be intercepted. The back screens being kept on, not only keeps the cold and the winds away, but prevents the heat entering on the enclosed or open side from being lost by radiation. It is a strange sight to see these Potato beds up and green in the open air in April.

Potatoes are ready for market early in May, and are packed in neat hampers, each containing 20 lb., and sometimes realising as much as 1s. per lb., which is considered a good price. They are bought up by the dealers who convey them to the manufacturing towns, such as Bolton, Barnsley, or Manchester; and quite an ovation is paid to the person who takes the first consignment to market. Innkeepers, shopkeepers, and others, present him with pieces of ribbon of every possible pattern and colour, which are pinned on every available portion of the dress, so that when these men come back from market they are literally thatched, as it were, with ribbons. Thus we have described at length, and we trust clearly, the practice followed to a very great extent by cottagers and small farmers. Gardeners will at once see the value of this system as the means of raising an intermediate crop between those grown under glass and warm borders in the open ground; and these pits could in most gardens be utilised for other crops after the Potatoes. What a charming place for salading in parching summers, and what capital places to protect such plants as Lettuces or Cauliflowers, till the middle of February! No such use, however, is made of them by the Potato growers. When the Potatoes are off the soil is thrown up into high ridges, and remains so until wanted again.

## Report on Potatoes grown at Chiswick in 1873.

The Fruit and Vegetable Committee, having decided upon testing the numerous varieties of Potatoes that were in cultivation, and ascertaining their various characteristics, application was made among the growers, and no fewer than what purported to be 271 distinct varieties were secured. These, with a few exceptions, were planted on the 24th of March, and the sets used were good medium-sized whole tubers, when these could be obtained; but in some instances they were small, and then the produce was much inferior. The ground was well dug in the autumn of the previous year, but not manured, this having been done for the crop of Peas which had just been removed. The tubers were planted in lines 3 ft. apart, and 20 in. between the tubers. The plants came up regularly, with a strong growth; but on the 20th of May they were attacked by a strong frost, which cut them very much, some of them being as much as 6 in. above the ground. They soon, however, recovered, and grew luxuriantly, being subjected to the usual mode of cultivation, by hoeing and earthing up. On the 29th of July the disease first made its appearance by attacking the variety called Golden Gem, spreading in a few days with great rapidity to Lapstone, Fortyfold, Red Emperor, nearly all American kinds, and the Regent class. The haulm of all these sorts was soon destroyed; and of the tubers, those of Regents suffered most severely, about nine-tenths being diseased, and of some kinds, although there was an excellent crop, scarcely a sound tuber remained. There was no variety that was not more or less diseased, those escaping with the least injury being the very early and the very late kinds. During the growing season, the collection was examined five times by the Committee, and the first result arising from the experiment was to reduce the 271 varieties to 115; which number may be still further reduced by rejecting those that are inferior and worthless.

## Series 1.—Skin White or Straw-coloured.

### § 1. *Long or Kidney-shaped.*

**Ashleaf Kidney** (syns., Marjolin, Oakleaf, Duckstone).—Haulm fleshy, spreading, rarely more than two or three from one tuber, 12 in. to 18 in. long; stem of a pale green colour; leaflets large, broad, rounded, slightly cupped, bright green, shining; flowers very rare; tuber medium-sized, long, tapering, kidney-shaped; eyes full, situate at one end and on big knobby protuberances, giving the tuber an irregular appearance; skin smooth, pale straw-coloured; flesh pale yellow or straw-coloured, firm; quality excellent; moderate cropper. First early—July and August. This is considered the old or original type.

**Kentish Ashleaf Kidney** (syns., Veitch's Improved, Cave's Seedling, Cambridgeshire Kidney, Nutbrown, Alma Kidney, Early May, Benson's Seedling, Shepherd's Kidney, Reynard, Nonesuch, Tory, Conqueror, Mona's Pride, Champion, Early Ranelagh, Laing's First Crop, Stillyan's Kidney).—Haulm slender, several stems from one tuber, 12 in. to 18 in. long; stem having a strong purplish tinge; leaflets small, pointed, green; flowers very rare; tuber medium-sized, long, tapering, kidney-shaped, not so much knobbed as the true Ashleaf; eyes full; skin smooth, pale straw-coloured; flesh pale straw-coloured, firm; quality excellent. Excellent cropper. First early; July and August.

**Myatt's Ashleaf Kidney** (syns., Rivers's Royal Ashleaf; Sandringham Kidney, Myatt's Prolific, Gloucestershire Kidney, Derbyshire Prizetaker, Lee's Hammersmith Kidney).—Haulm and tuber similar to Kentish Ashleaf; flowers pale lilac, and sparingly fertile. Excellent quality. Great cropper.

**Jackson's Improved.**—Haulm similar to Kentish Ashleaf; tuber medium size, long, tapering, kidney-shaped, slightly knobbed; eyes a little sunken, few and small; skin rough white; flesh very pure white, firm; very handsome. Excellent cropper. First early—July to September.

**Nettle-leaved** (syns., A Feuille d'Ortie, Hardy's Improved Albert, *Improved Royal* Albert, Carter's Champion Forcing, Early

Bedfont Kidney).—Haulm slender, spreading, 1½ ft to 2 ft. in length; stem with a purplish tinge; leaflets small, much curled, slightly rugose, light green; tuber medium-sized, very long, tapering, rounded, but sometimes flat, with knobs; eyes full; skin smooth, pale straw-coloured; flesh firm, pale straw-coloured. Good cropper. First early.

**Early White Kidney.**—Haulm moderately strong, spreading, about 1½ ft. in length; similar in character to the Ashleaf, but stronger; stem pale green; leaflets medium-sized, curled, pale shining green; tuber large, of a rather irregular shape, a little knobbed; eyes full; skin smooth, white; flesh white, firm; quality excellent. Good cropper. First early. First-class certificate.

**Alice Fenn.**—Haulm and habit of growth very similar to Ashleaf, about 1½ ft. in length, spreading, pale green; leaflets small, much curled, showing the under-surface; tuber of medium size, resembling the Ashleaf; eyes few; skin smooth, pale straw-coloured; flesh pale straw-coloured, firm. Good cropper. First early. First-class certificate.

**Little Gem** (syn., Early Gem).—Foliage and general habit of growth similar to Ashleaf, but stronger, and a later grower, and stems lightly tinged with purple; 1 ft. to 1½ ft.; tuber small, rather long, but neat kidney-shaped, with a few small knobs; eyes full, rather large.

**Early Border.**—Habit and appearance like Kentish Ashleaf; haulm very slender, about 9 in. in length; tuber small, short, or half-round kidney; eyes full; skin smooth, pale; flesh pale. Very early. Useful for frame work.

**Reine de Mai.**—Haulm slender, spreading, 1½ ft. to 2 ft. in length; stem pale green; leaflets broad, pointed, green, slightly rugose; flowers small, white, fertile; tuber medium size, round kidney shape; eyes small and few; skin smooth, yellowish; flesh pale yellow. Good cropper; early.

**Marjolin Tetard.**—Haulm robust, spreading, resembling Ashleaf, but much stronger, about 18 in. long; stem pale green; flowers white, fertile; tuber large, very broad, flat at the crown end, and tapering like a wedge to the stalk end; eyes full, but few; skin smooth, dark straw; flesh straw-coloured. Heavy cropper. Early, succeeding the Ashleaf.

**Woodstock Kidney.**—Haulm robust, spreading or prostrate, about 2½ ft. in length; stems few in number, dark purplish colour; leaflets large, shining, deep green; flowers white, fertile; tuber medium size, rather broad, irregular-shaped kidney; eyes few and small; skin rough, dark straw; flesh white, firm. Moderate cropper.

**Burpitt's Bountiful.**—Haulm slender, spreading, about 12 in. in length; stem purplish; leaflets small (like the Nettle-leaved), deep green, but much later; flowers light purple, fertile; tuber medium size, short, broad, flat; eyes few and small, full; skin smooth, pale straw; flesh white. Fine quality; average cropper. Second early.

**Multum in Parvo.**—Haulm slender, about 12 in. in length; leaflets small—the whole plant much resembling in general appearance a dwarf form of Kentish Ashleaf; flowers very rare; tuber small, short, flat kidney-shape; eyes small, about level with surface; skin a little rough, dark straw-colour; flesh firm, white. Very small cropper. Very early.

**Yorkshire Hybrid** (syn., Quarantine de la Halle).—Haulm robust, about 2½ ft. in length; stem deep green; leaflets broad, rugose, green; flowers pale, produced abundantly, and followed by berries in great abundance; tuber large, rounded, long kidney-shaped, tapering somewhat to each end, a little coarse in appearance; eyes large, slightly sunken; skin smooth, pale straw-coloured; flesh pale straw, firm. A moderate cropper. Second early.

**New Early Racehorse.**—Very similar to Yorkshire Hybrid, having broader leaflets, and growing to little more than half the height. Moderate cropper.

**Pioneer.**—Haulm slender, 12 in. to 18 in. in length; stem pale green; leaflets abundant, small, rugose, pointed, pale green; flowers very rare; tubers medium size, very irregular, kidney-shaped, coarse-looking; eyes numerous, sunken; skin smooth, dark straw; flesh yellow, firm; throws the tubers out on the surface of the soil. Moderate cropper. First early.

**Waterloo Kidney.**—Haulm slender, 1½ ft. in length, somewhat resembling Myatt's Prolific, but having the leaflets much more crumpled; berry-bearing; tubers large, long, tapering, and handsome; eyes a little sunken, rather numerous, situate over nearly three-fourths of the tuber; skin pale straw, smooth; flesh firm, white. Excellent quality. Moderate cropper. Second early.

**Dawe's Matchless** (syns., Webb's Imperial, Wormsley).—Haulm moderately strong, of somewhat spreading growth, about 2 ft. high; stem slightly purple at the base; leaflets of medium size, deep green, and much crumpled or rugose; flowers small, dirty white, fertile; tubers large, long, flattened, of regular form; eyes rather numerous, prominently diffused over three parts of the surface; skin pale, smooth; flesh white, firm, fine quality. A very handsome Potato; good cropper. Second early.

**Excelsior Kidney.**—A stronger-growing and much improved form of Dawes' Matchless, producing a larger and finer sample. Extra fine quality. First-class certificate.

**Berkshire Kidney.**—Haulm moderately robust, spreading, about 1½ ft. long; stem tinged with purple; leaflets broad, pale green, rugose, with rather short petioles; flowers dirty white, fertile; tubers medium-sized, flat, kidney-shaped; eyes few, and rather full; skin smooth, pale; flesh straw-coloured, rather close-grained. Light cropper. Second early.

**Jaune de Brie.**—Haulm robust, of erect growth, about 2 ft. in *length; stem* pale green; leaflets small, rugose, like the Regent *type, pale green;* flowers pale blue, very fertile; tubers above average size, long, cylindrical, tapering; eyes small, slightly sunken; skin smooth, pale yellow; flesh pale yellow, firm. Moderate cropper. Second early.

**Prince of Wales.**—Haulm moderately robust, spreading, and seldom branching, about 2 ft. in length; stem tinged with purple; leaflets large, broad, deep shining green, very distinct; flowers pale blue, fertile; tubers large, kidney-shape, somewhat tapering; eyes full, at times situate on raised knobs like the Ashleaf; skin smooth, clear; flesh rather coarse, pale straw. A very handsome Potato, but not of good quality. Average cropper. Second early.

**King of Flukes** (syns., Queen of Flukes, Birmingham Prize-taker, Derbyshire Prize).—Haulm, etc., similar to Dawe's Matchless, moderately robust, from 1½ ft. to 2 ft. in length; leaflets of medium size, deep green, rugose; flowers pale blue; berries large; tubers large, broad, flat, of even form; eyes full; skin smooth, pale straw; flesh pale straw, hard. Very handsome Potato; has the habit of growing out on the surface of the ground, many of the tubers thus becoming green. Moderate cropper. Second early.

**Vanguard.**—Haulm rather slender, from 1½ ft. to 2 ft. in length; stem tinged with purple; leaflets deep green, rugose; similar to Dawe's Matchless, but dies off earlier; tubers medium, short, flat; eyes full, few in number; skin smooth, pale; flesh pale, firm. Moderate cropper. First early.

**Beta.**—Very similar to preceding, but later and inferior.

**Sextus.**—Haulm and foliage somewhat similar to Dawe's Matchless, of a neat, sturdy growth; tubers medium size, short, flat, of regular form; eyes few and small; skin rough, pale straw-coloured; flesh pale, firm. A handsome Potato of the Fluke section. Moderate cropper.

**Harbinger.**—Plant of the same character as Sextus. Tubers rather small, short, flat, and irregular in form; eyes small; skin smooth, pale; flesh pure white, firm. Fluke section. Light cropper. Third early.

**Lapstone** (syns., Haigh's Seedling, Cobbler's Lapstone, Almond's Yorkshire Hero, Pebble White, Headley's Nonpareil, Huntingdon Kidney, Yorkshire Hero, Perfection, Rixton Pippin, Ashtop Fluke).—Haulm of moderately robust growth, from 1½ ft. to ft. in length; stem pale green, sometimes tinged with purple; leaflets large, broad, very pale green, of a very distinct character; flowers white, produced in great abundance, but very rarely succeeded by berries; tubers of medium size, of rather irregular form, some being kidney-shaped, others broad, flat, and some cylindrical and rounded; eyes small, full, and few; skin smooth, pale straw-coloured, generally having a tinge of purple at the crown, which is a characteristic feature; flesh pale straw, firm. Very apt to supertuberate in some soils and seasons, and to continue to grow late instead of ripening off; a great cropper; of most excellent quality. Rather subject to disease. The varieties of this Potato are very numerous, but have no permanent distinctive characters. Second early; fit for use from October until May.

**Fluke.**—Haulm of robust growth, from 1½ ft. to 2 ft. long; stem of a dark purplish colour; leaflets rather small, rugose, deep green; flowers small, crumpled, white; fertile; tubers large, generally broad, flat, of somewhat irregular form; eyes full; skin slightly rough, of a dark straw colour; flesh pure white, firm. A heavy cropper in some soils; excellent quality. Late.

**Model.**—Haulm and foliage very similar to Fluke; leaflets a little pointed; grows very late; flowers white; tubers short, broad, flat, with a blunt end; skin smooth, pale straw-coloured; flesh white, rather close. A very handsome Potato; heavy cropper. Late.

**Amazon.**—Haulm and foliage of the Berkshire Kidney character, but of somewhat stronger and later growth; height 1½ ft.; flowers white; tubers medium size, short, broad, flat, rather irregular; eyes few, a little sunken; skin smooth, pale; flesh pale straw, firm. Moderate cropper. Late.

**Utilis**—.Haulm of strong-growing Fluke character, somewhat spreading, about 2 ft. long, and foliage shining; tubers large, flat, coarse, and irregular; eye small, sunken; skin rough, pale straw-coloured; flesh pale, firm. Light cropper. Late.

**Cobble.**—Haulm rather slender, spreading, somewhat of the character of Dawe's Matchless, from 1½ ft. to 2 ft. long; leaflets broad, shining green; flowers dirty white; tubers large, long, flat, but somewhat irregular, the end blunt; eyes small, full; skin smooth, pale straw; flesh pale, close. Moderate cropper.

**Sedilla.**—Same haulm and foliage as Cobble; tubers large, flat, irregular; end blunt or flattened; eyes a little sunken at crown; skin rough, dark straw-coloured; flesh close, yellow. Moderate cropper. Late and worthless.

**Clipper.**—Haulm moderately vigorous, from 1½ ft. to 2 ft. long; stem deep green; leaflets broad, rugose, green; flowers pale, berry-bearing; tubers large, long, cylindrical; eyes very numerous, much scattered, forming large knobs on the tuber, giving it a coarse appearance; skin smooth, straw-coloured; flesh pale straw, close-grained. Light cropper. Second early. Worthless.

**Eureka.**—Plant of compact growth, very robust; haulm green, about 2 ft. long, grows very late; leaflets small, deep green, somewhat crumpled and rugose; flowers bright purple, seldom producing berries; tubers large, broad, flat, of the Fluke character; eyes full; skin pale, a little rough; flesh white, firm. The latest of all to ripen off. Moderate cropper. Sample very irregular.

**Princesse.**—Haulm slender, spreading, but of compact growth, about 1½ ft. long; stem light green; leaflets smooth, light green: flowers pale blue, producing berries; tubers long, narrow, cylindrical, somewhat tapering and twisted; eyes full, very numerous, scattered over the entire surface; skin coarse, pale; flesh pale, firm. A peculiar but utterly worthless variety. Light cropper. Secon dearly.

***Oxfordshire Kidney*** (syn., Minchin's Eclipse). —Haulm moderately robust, of erect growth, with the character of Dawe's Matchless, 2½ ft. long; stem pale green throughout; leaflets pale green, rugose; flowers bright blue, fertile; tubers of average size, rather short, flat, of even and regular form; eyes few and small; skin very rough, dark straw-coloured; flesh pale, firm. Good cropper. Grows late. Handsome.

### § 2. *Half-long.*

**Giant King.**—Haulm slender, of the character of the Kentish Ashleaf, 12 in. to 18 in. high; leaflets somewhat pointed, rugose, with a purplish tinge; tubers large, broad, flat, somewhat irregular eyes large, sunken; skin smooth, straw-coloured; flesh pale straw-coloured, rather close. Average cropper. Rather a handsome large tuber from so dwarf a plant. First early.

**Milky White.**—Haulm slender, of spreading growth, about 12 in long; stem reddish; leaflets small, crumpled, like those of the Nettle-leaved; flowers light blue, fertile; tubers rather below medium size, half-long, rounded; eyes full; skin smooth, pale; flesh very white, firm. A moderate cropper. Comes rather early into use.

**Peake's First Early.**—Haulm slender, of the character of the Kentish Ashleaf, about 9 in. high, ripens off very early; tubers medium-sized, half-long, broad, flattened, resembling Giant King; eyes a little sunken, mostly situate at the crown; skin smooth, pale straw-coloured; flesh yellow, rather close. A fair cropper. Very early.

**Bresee's Climax** (syns., Gravenstein, Coppermine, Climax).—Haulm moderately strong, about 1½ ft. long; stem light green, erect, branching; leaflets large, broad, pale green, frequently blotched with yellow; flowers rare; tubers large, long, rounded, somewhat tapering; eyes a little sunken, rather thickly situate near to the crown; skin rough, straw-colour; flesh white, firm. Excellent quality, great cropper, and the best type of the American White Potatoes. Second early. First-class certificate.

**Early Goodrich** (syn., Bushell's Seedling).—Haulm very similar in character to Climax; tubers smaller, and of a coarser appearance than Climax, but much resembling it; inferior. Moderate cropper. Second early.

**Springfield White** (syn., Harrison's).—Haulm and foliage of the same character as Climax, but paler and of a much stronger growth, and leaflets more pointed; flowers white, sterile; tubers very large, half-round, frequently flattened, rather coarse in appearance; eyes large, a little sunken; skin smooth, nearly white; flesh close, pure white. Heavy cropper. Second early.

**Bresee's Peerless** (syn., Peerless).—Haulm moderately vigorous, from 1½ ft. to 2 ft. long; stem deep green, of the same general character as Climax; leaflets broad, green; flowers very rare; tubers large, long, broad, flat, somewhat tapering; eyes a little sunken, having a faint tinge of pink; skin slightly rough, straw-colour; flesh white, firm. Heavy cropper. Very handsome. Mid-season.

**Bresee's Prolific** (syn., Brown's Prolific Kidney).—Haulm vigorous, 1½ ft. in length; same character as Climax, but having the leaflets rather smaller; stem pale green; tubers large, long, flat, even, handsome shape; eyes full, a little sunken, of a pretty pink colour; skin thin, smooth, straw shaded with faint pink; flesh white. A heavy cropper and particularly handsome. Mid-season.

**Charden.**—Haulm very robust, branched, about 3 ft. in length; stem pale green; leaflets pale green, rugose, pointed; flowers abundant, pale shaded lilac; berries few; tuber very large, very coarse and irregular, of a long rounded form, somewhat tapering; eyes numerous, wide, very much sunken; skin smooth, pale; flesh pale straw. A great cropper. A very coarse cattle Potato. Mid-season.

**Golden Gem** (syn., Jaune Ronde Hative).—Haulm slender, spreading, from 2 ft. to 2½ ft. in length; stem pale green; leaflets small, rugose, pale green; flowers pale; tubers medium-sized, of a long rounded form; eyes numerous, scattered, much sunken; skin smooth, yellow; flesh yellow, firm.

**Dourie Hall Favourite.**—Haulm robust, of compact growth, about 3 ft. in length; stem pale green; leaflets large, broad, pale green; flowers bluish-white; berries none; tubers medium-sized, half-round, sometimes long; eyes few; skin a little rough, pale straw-coloured; flesh white, firm. Good cropper. Mid-season. Very distinct.

**Paterson's Victoria.**—Haulm of strong upright growth, about 2½ ft. in length; stem pale green, tinged with purple; leaflets small, rugose, somewhat pointed, green; flowers purple; berries numerous, very large; tubers medium-sized, half-round, frequently a little flattened, with a blunt end; eyes a little sunken; skin rough, but sometimes smooth, pale straw; flesh white, firm. A very excellent even-cropping Potato. Late.

**Dalmahoy** (syn., Goldfinder).—In haulm and general growth not distinguishable from Regent; ripens off earlier, and has the habit of throwing the tubers a little more on to the surface of the ground; tubers above medium size, generally of more even and regular form than those of Regent, but of very similar character. A very productive excellent Potato for general use.

**Walker's Early.**—Like a strong Regent, but having the tubers much smoother in the skin and with deeper eyes than Regent.

**Early Prince.**—Haulm, etc., same character as Regent, but ripens off much earlier; tubers large; eyes rather deep; skin smooth, like Walker's Early. Second early.

**Early Shaw.**—Haulm, etc., of somewhat slender Regent character of growth, and ripens off earlier; flowers sterile; tubers medium size, roundish, frequently half-long and broad; eyes large or wide, a little sunken; skin smooth, pale straw-coloured; flesh pale straw-coloured. Average cropper. Second early.

**East Somerset Champion.**—Haulm moderately robust, of the Regent character, but stem slightly coloured; tubers very large, broad, flat, of somewhat irregular form, being blunt at the crown and *hollowed at the stalk*; eyes small, rather sunken; skin a little rough, pale straw-coloured; flesh pale straw, rather close. A very heavy cropper. Ripens same time as Regent, but is in best condition for use late in spring.

**Early Perfection.**—Haulm, etc., of somewhat slender Regent character of growth, about 18 in. in length; leaflets rather broad, flat; flowers pale blue, sterile; tubers below medium size, roundish, but frequently long; surface very even and regular; eyes very few and full; skin clear, pale straw, a little rough; flesh pale straw. Light cropper. Early.

**Early Union.**—Haulm rather slender, of the character of the Kentish Ashleaf, about 1½ ft. in length; flowers pale lavender, sterile; tubers medium size, round, of even, regular form, a little flattened at the crown and hollowed at the stalk; eyes few, a little sunken, nearly all situate at the crown; skin clear pale straw, a little rough; flesh pale straw. A good cropper. Very nice clean-looking Potato. Early.

**Rector of Woodstock.**—Haulm rather slender, spreading, from 2 ft. to 2½ ft. in length; stem slightly coloured purple; leaflets small, rugose, green; flowers bluish, succeeded by berries; tubers rather below medium size, of roundish form, frequently a little flattened at the crown; eyes small, mostly situate at the crown; skin smooth, clear, pale straw; flesh pale straw, very firm. Excellent quality. Moderate cropper. Early. A very pretty Potato. Previously certificated.

**Fenn's Early Market.**—Haulm slender, resembling the Ashleaf Kidney, about 12 in. long; stem green; leaflets small, curled, green; sterile; tubers medium-sized, of roundish form, sometimes a little broad and elongated, and hollowed at the crown; eyes slightly sunken; skin a little rough, very clear, pale straw; flesh pale straw. Excellent quality. A very clean, handsome-looking Potato, and a good cropper. First early. First-class certificate.

**Bonnie Wilhelmine.**—Haulm rather slender, spreading about 2 ft. in length; stem a little coloured; leaflets rather broad, rugose, pale green; flowers pale blue, fertile; tubers below medium size, half-round, even form; eyes few and full; skin smooth, clear, pale straw-coloured; flesh pale straw-coloured. A moderate cropper. Second early.

**Seedling No. 1.**—Haulm of weak, erect growth, about 12 in. in length; stem green; leaflets small, rugose, green; tubers small, roundish; eyes few, full; skin a little rough, pale straw. Light cropper. Second early.

**Prince's Favourite.**—Haulm, etc., slender, of the character of Kentish Ashleaf, about 18 in. long; tubers very small, round; eyes few, a little sunken; skin clear, pale, smooth; flesh pale straw. Worthless. Second early.

**Paxton's Wonder.**—Haulm moderately vigorous, about 1½ ft. in length; stem green; leaflets broad, pale, green, like Lapstone, but rugose; sterile; tubers small, round, even and regular; eyes few, full; skin smooth, clear; flesh pale straw. Small cropper. Early, but too small.

**The Bloomer.**—Haulm slender, very spreading, from 12 in. to 16 in. long; stem green; leaflets very much curled, pale green; flowers pale, fertile; tubers small, round, of even, regular form; eyes full; skin clear, smooth; flesh pale straw-coloured. Small cropper. Early. Too small.

**Pritchard's Seedling.**—Haulm small, of erect growth, about 12 in. long; stem green; leaflets broad, deep green, rugose; flowers pale, fertile; tubers medium-sized, half-round, even form; eyes few, full; skin smooth, pale straw; flesh pale, firm. Light cropper. Mid-season.

**Royal Danish.**—Haulm small, of erect growth, from 18 in. to 2 ft. long; stem a little coloured purple; leaflets small, much pointed, rugose, bright green; tubers below medium size, half-round, a little elongated; eyes sunken; skin smooth, pale; flesh pale yellow, soft. Light cropper. General season. Too small; worthless.

**Onwards.**—Habit same as Kentish Ashleaf, with somewhat darker and more rugose leaflets; flowers sterile; tubers very small, flat, round, irregular; skin pale straw-coloured; flesh pale. Early. Too small; worthless.

**No. 2 White-blossomed.**—Haulm robust, but prostrate, about 2 ft. long, not branched; stem of a purplish tinge; leaflets very broad, rugose, green; flowers white, sterile; tubers large, broad, flat, coarse, and uneven; eyes prominent; skin smooth, pale straw-coloured; flesh white, rather soft. A moderate cropper. Second early.

## Series II.—Skin Red.

### § 1. *Long or Kidney-shaped.*

**Early Sovereign.**—Haulm of compact growth, about 12 in. long, ripens off early; stem pale green; leaflets very large, broad; flowers rare; tubers average size, of a long, narrow, cylindrical form, slightly tapering; eyes scattered over the entire surface, but not too numerous, a little sunken; skin smooth, of a pale rose colour; flesh white. A good average cropper. Early.

**American Late Rose** (syn., American Pale Rose.)—Haulm of free, vigorous growth, about 2 ft. long; stem pale green; leaflets large, broad, very pale green; flowers white, generally sterile; tubers very large, long, cylindrical from 7 in. to 10 in., and generally a little flattened; eyes not numerous, but scattered nearly over the entire surface, a little sunken, of a deep rose-colour; skin smooth, pale rosy pink, very pretty; flesh white and floury. Excellent quality. A most enormous cropper—from eight to ten large tubers being produced at a single stool, and frequently much more, and these tubers often weighing over a pound each. Second early. First-class certificate.

**American Early Rose.**—Haulm and habit of plant exactly resembling the Pale or Late Rose; ripens off earlier, and is not so tall *in stem or so pro*ductive; the tubers, also, are smaller, more kidney-shaped, and of a more uniform pink or rose colour. Much inferior o the Late Rose.

**Extra Early Vermont.**—Haulm and habit of plant similar to Early Rose, but only about 12 in. long, ripens off very early; tubers large, long, cylindrical, somewhat flattened, very similar in all characters to Late Rose, but ripe some ten days earlier; flesh white and floury. Very excellent quality. Average cropper. Early. First-class certificate.

**Belvoir Kidney** (syns., Taylor's Kidney, Rognon Rose).—Haulm rather slender and straggling, about 2 ft. in length; stem tinged red; leaflets rather small, dark green, rugose; flowers white, sparingly fertile; tubers average size, long, flat, regular kidney shape; eyes very few and small; skin smooth, dull pink; flesh yellow. Handsome in appearance. Average cropper. Mid-season.

**Wonderful Red Kidney.**—Haulm rather slender, very much of the character of Kentish Ashleaf, from 12 in. to 18 in. long; leaflets small, rugose, having a reddish tinge; tubers rather small, but neat in form; eyes few, full; skin smooth, pale red; flesh yellow. A great cropper, but the greater portion are very small and worthless. Early.

**Pousse Debout.**—Haulm vigorous, of compact growth, about 2 ft. in length; stem reddish; leaflets broad, green; flowers white, fertile; tubers small, long, narrow, tapering, rounded kidney; eyes full, on raised knobs; skin smooth, pale red; flesh pale, firm. A great cropper, but the greater portion are quite small and worthless. Mid-season.

**Saucisse.**—Haulm rather slender, but growing to nearly 4 ft. in length, and branching; stem reddish; leaflets small, rugose, green; tubers average size, short, broad, flat, rather irregular in form; eyes full, even; skin smooth, deep rose; flesh yellow, hard, frequently streaked with red. A great cropper, but very inferior. General season.

**French Rod.**—Haulm very vigorous, branching from 3 ft. to 3½ ft. in length, grows late; stem reddish; leaflets small, rugose, deep green; tubers average size, but very irregular in form, some being round, others long cylindrical; eyes numerous, scattered over the entire surface; skin rough, red; flesh yellow. A great cropper, but the greater portion very small and worthless. Late.

**Cottager's Red.**—Haulm moderately vigorous, straggling, about 4 ft. in length; stem reddish; leaflets small, rugose, green; tuber average size, of rather irregular form, some being long, broad, and flat, whilst others are nearly round; eyes scattered, a little sunken; skin rough, bright red; flesh yellow. A somewhat irregular cropping Potato.

**Rose de Conflans.**—Haulm vigorous, of compact growth, from 3 ft. to 3½ ft. in length; stem reddish; leaflets broad, green; flowers white, fertile; tubers average size, very long, narrow, cylindrical, twisted, and tapering, with knobs; eyes full, scattered; skin smooth, dull red; flesh yellow, streaked with red. A very peculiar-looking, but altogether worthless, variety.

**Prince Imperial.**—Haulm moderately robust, spreading, from 2 ft. to 2½ ft. in length; stem reddish; leaflets small, pale green, rugose; flowers white, fertile; tubers average size, of rather irregular form, a long, pointed kidney, frequently twisted like a crab's claw; eyes few, full; skin rough, reddish purple; flesh yellow. Moderate cropper. General season. Worthless.

**Vitelotte.**—Haulm very robust and gross, about 2½ ft. in length, and grows late: stem green, with a reddish tint; leaflets rather broad, rugose, green, with reddish veining; flowers white, fertile; tubers small, long, narrow, cylindrical, and pointed or tapering; eyes deep, covering nearly the entire surface, so that it appears to be nearly all eyes; skin smooth, reddish-purple; flesh white, streaked with red. A very singular variety, but entirely worthless. Fit to be grown only as a curiosity.

**Bountiful.**—Haulm rather slender, spreading, from 1½ ft. to 2 ft. in length, ripens off early; stem reddish; leaflets small, green, rugose; flowers white, fertile; tubers of true kidney shape, medium size, short, even, and of very regular form; eyes few, full, giving it a very smooth, even surface; skin smooth, reddish-purple; flesh pale, firm. A very neat, handsome Potato, and a fair cropper. Second early.

**Rognon Violet.**—Haulm rather slender and straggling, about 3½ ft. in length; stem purple; leaflets small, rugose, dark green; flowers white, fertile; tubers large, long, flat, kidney shape, of even, regular form; eyes full, scattered, but not numerous; skin smooth, reddish-purple; flesh pale straw, firm. A fair average cropper. Late.

**Callo.**—Whole plant somewhat of the Lapstone character; haulm moderately robust, about 2 ft. in length; stem pale green, tinged red; leaflets broad, pale green, quite smooth; tubers medium size, long, cylindrical, regular form; eyes wide, scattered, of a dark purple; skin smooth, reddish-purple; flesh white, firm. A heavy-cropping Potato. Late.

**California Kidney.**—Haulm slender, about 1½ ft. in length, ripens off early; stem pale green; leaflets broad, green, rugose, of the Regent type; flowers few, pale blue, sterile; tubers large, long, cylindrical; eyes numerous, deeply-placed, and scattered over entire surface, giving it a rough, uneven appearance; skin smooth, bright red, occasionally flaked with white; flesh pale straw, hard, coarse. Moderate cropper. Early.

**Truffe d'Aout.**—Plant of vigorous compact growth, of the appearance of Myatt's Prolific, about 1½ ft. in length; flowers pale, fertile; tuber below medium size, of short oblong shape; eyes deep, numerous, scattered; skin a little rough, dull red; flesh pale yellow, streaked with red. A moderate cropper, but a very bad worthless sort. Late.

## § 2. *Round.*

***Red Emperor.***—*Haulm* slender, straggling, and spreading, about *2 ft. in length;* stem tinged with red; leaflets small, pointed, rugose, light green; flowers light blue, sparingly fertile; tubers medium-sized, round, somewhat flattened, very even and regular; eyes full and few, of a bright red; skin generally smooth, of a clear light red, sometimes with a flake of white; flesh pale straw, firm. Excellent quality. A very handsome Potato. Average cropper. Second early. It is somewhat tender and subject to disease.

**Combe Hays.**—Very similar to Red Emperor, but somewhat later. Bears berries in abundance, and the tubers have somewhat rougher skins.

**English Rose.**—Haulm and foliage similar to Kentish Ashleaf, about 12 in. high, ripens off early; flowers reddish-white; tubers small, round, with a smooth even surface; eyes full, small; skin smooth, pale red; flesh white, streaked with pink. Early, but too small, and not of good quality.

**King of the Earlies.**—Haulm of compact growth, about 12 in. long, ripens off very early; stem pale green; leaflets very large, broad, of a very pale green; flowers very rare; tubers average size, half-round, flat; eyes a little sunken; skin smooth, of a faint rosy-pink colour; flesh white. Moderate cropper. Early.

**Rouge de Strasbourg.**—Haulm very robust, much branched, of erect and compact growth, about 3 ft. in length, grows very late; stem purplish; leaflets rather broad, dark green-shaded purple; flowers purplish-white, seldom fertile; tubers medium size, long, roundish, irregular, coarse; eyes deep, numerous, scattered over entire surface; skin smooth, deep red; flesh white, close-grained. Bad. A coarse, heavy-cropping late Potato.

**Red Regent** (syn., De Zelande).—Haulm very robust, much branched, of erect and compact growth, from 3 ft. to 3½ ft. in length; stem reddish; leaflets rather broad, light green; flowers white, seldom fertile; tubers large, exactly resembling the Regents; skin rough, deep red; flesh pale. A heavy-cropping late Potato, suited for field culture.

**Wood's Scarlet Prolific.**—Haulm moderately robust, of erect, compact growth, about 2 ft. in length, grows very late; stem light green; leaflets pale green, rugose; flowers light purplish, fertile; tubers very large, long, flattened, even, and regular, nearly all of the same size at a stool, and are borne close to the haulm; eyes deep, scattered over surface; skin rough, reddish-purple; flesh white, occasionally streaked with red. A very handsome late Potato, and a great cropper. Second-class quality.

**Webb's Red Blossom.**—Haulm robust, erect, but much branched, about 2½ ft. in length, grows very late; stem green; leaflets broad, rugose, green; flowers white, sterile; tubers long, flat, very irregular—some being large and handsome, but the greater portion small; eyes deep, scattered; skin rough, bright, purplish-red; flesh pale straw, streaked with red. Very coarse-growing. Great cropper. Late.

**Vermont Beauty** (syn., Brownell's Beauty).—Haulm small, of the same character as Early Rose, about 1½ ft. in length, ripens off early; leaflets broad, pale green; flowers purplish-white; tubers very large, long, broad, and flattened, very uniform in character, and borne close to the haulm, about five or six to each stool, with seldom any small ones; eyes wide open, scattered, but not numerous; skin rough, of a dull brick-red; flesh white, floury. Excellent quality. A remarkably handsome second-early red Potato, and a heavy cropper. First-class certificate.

**Red-skinned Flour-ball** (syns., Improved Red-skinned Flour-ball, Barkshire's Red-skinned Flour-ball, Red Peach-blossom, Boston Red, American Red, Kentish Red).—Haulm strong and robust, frequently much branched, from 3 ft. to 3½ ft. in length; stem pale, with a reddish tinge; leaflets medium-sized, flat, pointed, rugose, pale green; flowers shaded lilac or lavender, produced in great abundance, very seldom fertile; tubers very large, round, but frequently a little flattened, and often of very coarse and irregular form—one stool producing handsome well-formed tubers, whilst another produces them of all shapes and sizes; eyes mostly situate at the crown, which is a little sunken, and it is also a little hollowed at the stalk; skin rough, of a light red colour, but on many of the malformed tubers quite smooth, and of a deep red; flesh white, and, for a large Potato, of excellent quality. It is a large and heavy cropper. General season.

**White Peach-blossom.**—Haulm of strong and compact growth, much branched, about 3 ft. in length; stem green; leaflets broad, pointed, smooth, green; flowers rosy-purple, fertile; tubers very large, round, coarse in appearance; eyes few, but deep, of a bright rose-colour; skin rough, of a pale pink colour; flesh white, firm. A very heavy-cropping, but coarse, late Potato.

## Series III.—Skin Purple or Blue.

**Paterson's Blue** (syn., Morayshire Blue).—Haulm robust, of compact, rather erect growth, about 3 ft. in length; stem reddish leaflets small, rugose, deep green; flowers purplish-white, occasionally fertile; tubers large, round, flattened, frequently elongated, rather coarse in appearance; eyes deep, scattered; skin smooth, reddish-purple; flesh white, very firm. Moderate cropper. Late.

**Purple Regent.**—Plant habit of true Regent, but having a reddish stem, and the leaflets of a somewhat deeper green; flowers purplish-white, seldom fertile; tubers medium-sized, half-long, a little flattened, seldom uneven, but rather coarse in appearance; eyes small, scattered; skin smooth, reddish-purple; flesh white, firm. A very poor cropper, and a generally bad sample. General season.

**Compton Surprise.**—Haulm very robust and gross, from 2½ ft. to 3 ft. in length, ripens off early; stem green, tinged with red; leaflets very large, broad, pale green; flowers white, sterile; tubers large, long, flattened, coarse in appearance; eyes numerous, *very deep, scattered* over entire surface; skin smooth, dark purple;

flesh white, firm. A moderate cropper. Mid-season. Rather coarse.

**Scotch Blue** (syn., Duncan's Seedling).—Haulm moderately vigorous, about 2 ft. in length, ripens off early; stem reddish; leaflets large, broad, rather pale green; flowers none; tubers medium-sized, oblong, flattened, frequently much elongated and cylindrical, with a smooth, even outline; eyes wide open; skin smooth, dark violet; flesh white, firm. Very handsome, but a very uncertain cropper. Mid-season.

**Summer Hill Seedling.**—Haulm very strong and robust, from 2½ ft. to 3 ft. in length; stem having a reddish tinge; leaflets large, broad, pale, with a tinge of red; flowers bluish, fertile; tubers medium size, oblong, flattened, of a finely-rounded, even outline; eyes small, full; skin smooth, dark purple; flesh white, firm. A very handsome Potato, and a fair average cropper. Late.

**Black Jack** (syn., Black Bob, Black Nigger).—Haulm robust, straggling, and somewhat branching, about 3½ ft. in length; stem reddish-purple; leaflets small, rugose, deep green; flowers blue, seldom fertile; tubers medium-sized, round; eyes deep; skin smooth, very dark purple, almost black; flesh dark mottled purple and white. A poor cropping and utterly useless late Potato. Fit only to be grown as a curiosity.

## Series IV.—Skin Streaked or Flaked.

**Gleason's Late** (syn., Hundredfold Fluke).—Haulm robust, branching, about 2½ ft. in length; stem of a reddish tinge; leaflets flat, pointed, green, with coloured veins; flowers purple, generally sterile; tubers large, generally broad, flat, like a Fluke, but frequently of very irregular form, as if two or three were joined together; eyes few, full; skin smooth, very pale, with large patches of rosy-purple, giving it a very singular piebald appearance; flesh white, rather hard. A good average cropper. Late. Very handsome.

**Painted Lady.**—Haulm strong and robust, of the Fluke character, but dies off earlier, from 2½ ft. to 3 ft. long; stem green; leaflets small, rugose, green, like Regents; flowers rosy-red, fertile; tubers very irregular in size and form, but chiefly small, of a long, flat kidney shape; eyes few; skin on some tubers rough, and on others smooth; some pure pale straw-coloured, others streaked and splashed with deep rosy-purple; flesh pale, firm. A light cropper, the greater portion being small. Late. Worthless.

**Willard** (syn., Belgian Wax Ball).—Haulm moderately strong, erect, from 1 ft. to 1½ ft. in length; stem pale green; leaflets broad, rugose, pale green; flowers very rare; tubers large, long, cylindrical, inclining to conical, generally of even and regular form; eyes wide, even with surface, scattered; skin rough, bright red, much flaked with white around the eyes; flesh white, hard, and inferior. A very handsome Potato. Moderate cropper. Second early.

**Red Breadfruit.**—Haulm slender, of rather compact growth, about 2 ft. in length; stem green; leaflets small, rugose, green, of the Regent character; flowers pale blue, fertile; tubers rather below medium size, round, somewhat hollowed at the crown and also at the stalk; eyes full; skin smooth, reddish-purple, flaked with white; flesh pale straw-coloured. A moderate cropper. Second early.

**Pink-eyed Rusty-coat.**—Haulm of strong but straggling growth, from 3 ft. to 3½ ft. in length; stem purplish; leaflets small, pointed, rugose, green; flowers deep rosy-purple, borne in great abundance, generally sterile; tubers large, of very irregular round form, and coarse; eyes wide open, of a rosy-red colour; skin smooth, white, flaked with pink; flesh white, firm. A heavy-cropping, but rather coarse Potato. General season.

**Blanchard** (syns., Fillpeck, Peake).—Haulm slender, spreading, from 12 in. to 18 in. in length; stem dark purple; leaflets small, rugose, dark green; flowers light or pale blue, fertile; tubers medium, round, flattened at the crown, even and regular sample; eyes nearly all situate at crown, full, of a dark purple colour; skin smooth, pale straw, flaked with purple; flesh yellow, firm. A clean, pleasant-looking Potato. Good quality. Moderate cropper. Second early.

**Rintoul's Striped Don.**—Haulm and habit of a robust-growing Regent; tubers very large, roundish; eyes deeply set, of a dark purple colour; skin rough, pale straw, streaked and flaked with purple; flesh pale, firm. A handsome and excellent great-cropping Potato. Second early.

**Fortyfold.**—Haulm and habit of Regent, but a little more slender; tubers scarcely medium size, round; eyes few, a little sunken; skin light, reddish purple, flaked with white; flesh white, firm. Excellent quality. Moderate cropper. Second early.

**Free-bearer** (syn., Benson's Round).—Haulm and habit of a strong-growing Regent, exposes the tubers on to the surface of the ground; tubers very large, rather coarse, long, rounded form, like Striped Don; eyes large, deep; skin rough, dark purple flaked with white; flesh white, firm. A heavy-cropping Potato, and good for general crop field culture.

## Potatoes grown in 1874 at Chiswick.

After the full and comprehensive trial of Potatoes made by the Fruit and Vegetable Committee in 1873, it was not again deemed necessary to continue the cultivation of so complete a collection. This trial, therefore, was confined to sorts which were not cultivated last season, or which were but imperfectly represented. Several of the leading types have been grown for comparison. The collection, about 158 in number, was planted on the 23rd of March, on well-trenched and manured ground. The sets were in most cases put in *whole, in lines,* 3 ft. apart, and about 20 in. between each set. The *plants came up well,* and looked promising, but were cut down by frost repeatedly. This caused a great number of stems to perish, and, combined with the exceeding dryness of the summer, tended to make the crop small, although it was of excellent quality. The disease did not make its appearance until the 6th of August, and then the tubers were affected, whilst no trace of it could be found on the haulm. Several varieties suffered severely, especially some of the American sorts, Lapstones, and Red-skinned Flour-ball. In 1873 the Regent class suffered most severely, and the Red-skinned Flour-ball was almost free, whilst in 1874 the result was exactly the reverse. Many of the stools had a dressing of Amies' patent chemical manures, which certainly tended to increase the crop. The Committee examined the Potatoes, whilst growing, four times, and awarded five first-class certificates. The number of assumed distinct varieties examined amounted to 280, not including some sixty unnamed seedlings. This formidable list was reduced by the detection of synonyms to 150 varieties, which have been described, and are probably distinct.

## Series I.—Skin White or Straw-Coloured.

### § 1. *Long or Kidney-shaped.*

**Mona's Pride.**—Haulm and general character of plant same as in Ashleaf kidney; tuber short, rather broad and flat. An excellent variety.

**Kentish Ashleaf Kidney.** Synonyms, Veitch's Improved, Cave's Seedling, Cambridgeshire Kidney, Nutbrown, Alma Kidney, Early May, Benson's Seedling, Shepherd's Kidney, Reynard, Nonsuch, Tory, Conqueror, Mona's Pride, Champion, Early Ranelagh, Laing's First Crop, Stillyan's Kidney, Gillman's Early Pebble (Gillman), Welbeck Seedling (Tillery), and Champion (Harrison & Sons).—This, in 1873, was considered distinct from Myatt's Ashleaf, on account of the latter being berry-bearing, whilst the Kentish was not so. It has, however, since produced flowers; so it is doubtful whether any distinctions really exist, further than what may be obtained by change of seed.

**Bonnemain** (Carter).—A very dwarf slender-haulmed variety of Kentish Ashleaf.

**Toddington Kidney** (Horley).—A later, more robust, and very productive form of the Kentish Ashleaf.

**Advancer** (Bell & Thorpe).—Haulm slender, compact, 12 in. to 15 in. long; stem pale green; leaflets small, pointed, pale green; flowers very rare; tuber short, flat, kidney-shaped; eyes full; skin smooth, pale straw-coloured; flesh pale, firm; moderate cropper. First early. Commended.

**Cattell's Reliance** (Cattell).—Haulm moderately robust, spreading, 2 ft. 6 in. in length; stem pale green; leaflets small, rugose, pale green; flowers purple, sterile; tuber medium-sized, of the general appearance of the Lapstone; eyes few and small; flesh white, very firm, of good quality. Ripe September 2. Second early.

**Cattell's Eclipse** (Cattell).—Haulm moderately vigorous, spreadin about 3 ft. in length; stem pale green; leaflets rugose, pale green; flowers light purple, rare; tuber medium-sized, in shape like the Lapstone; skin rough, pale straw; flesh white, firm; quality excellent. A fine second early. First-class certificate.

**Silverskin Kidney** (Dean). Synonyms, Sear's Seedling (Horley); Lady Abbess (Sutton).—Haulm robust, spreading 2 ft. in length; stem pale green; leaflets small, rugose, pointed, pale green; flowers large and handsome, white, abundant, fertile; tuber medium-sized, long cylindrical, rather coarse; eyes few, scattered, small, deeply sunken; skin rough, pale straw; flesh firm, white. A moderate cropper. Second early.

**Queen of Canada** (Stone).—A very large form of Dawe's Matchless.

**Confederate** (Veitch).—Haulm robust, spreading, 2 ft. in length; stem tinged purple; leaflets small, pointed, rugose, brightly green; flowers abundant, pale lavender; tuber very large, long, flattened, somewhat kidney-shaped; surface smooth, even; eyes few, small, full; skin a little rough, pale straw; flesh firm, white. A heavy cropper and very handsome. Second early.

**New Englander** (Hooper).—Haulm robust, erect, about 2 ft. 6 in. in height; stem pale green; leaflets large, pale green; flowers large, white, very abundant; tuber large, long cylindrical; eyes numerous, scattered over entire surface, small and deeply sunken; skin smooth, pale; flesh firm, white. Moderate cropper. A very coarse-looking Potato. The leaves decay from off the stem in a singular manner, the stem remaining erect until it crumbles all away. Second early.

**Shiner** (Harrison & Sons).—Haulm of the Regent character of growth, 2 ft. 6 in. long; stem tinged purple; leaflets dark green, rugose; flowers bluish-white, fertile; tuber large, broad, flat, of the Fluke character; eyes small, full; skin pale straw-coloured, a little rough; flesh close, yellow. A great cropper and handsome. General season.

### § 2. *Half-long.*

**President** (Dean).—Haulm slender, spreading, 2 ft. long; stem tinged with purple; leaflets small, rugose, pointed; flowers shaded lilac; tuber short, flat, very even and regularly formed; eyes small, few, ; skin pale straw-coloured, slightly rough; flesh firm, white; very handsome. Moderate cropper. Second-early Potato. Excellent quality.

**Cooling's Early Favourite** (Cooling). Synonyms, Sutton's Early Defiance Kidney (Sutton), Flower's Early Wide-awake (Flower), The Shiner (Dean).—Haulm robust, spreading, 21 in. long; stem slightly tinged purple; leaflets large, of the general appearance of Kentish Ashleaf; flowers very large, abundant, of a bluish colour; tuber medium-sized kidney, hollow at crown end; eyes situate on crown and on knobby protuberances, like the Ashleaf; skin clear, straw-coloured, very handsome; flesh close, pale straw-coloured. A very heavy cropper, of inferior quality. Second early.

**Cattell's Intermediate** (Cattell).—Haulm strong, vigorous, 3 ft. 3 in.

long; stem pale green; leaflets rugose, pale green; flowers white, tinged purple, fertile; tuber medium, greatly resembling Paterson's Victoria, flattened, broader at one end; skin rough, pale straw-coloured; flesh firm, white. Mid-season.

**Snowflake** (American: Carter & Co., Hooper & Co., Bliss & Sons). —Haulm moderately robust, compact, ripening early, 2 ft. long; stem pale green; leaflets large, broad-pointed, very pale green; flowers seldom opening; tuber large, long ovate, tapering towards the crown, very even and regular; eyes small, almost level with the surface of the tuber; skin pale straw-coloured, rough; flesh white, of good quality; a very heavy cropper. Early, and one of the most handsome of Potatoes.

**Dwarf White** (Bliss & Sons).—Haulm compact, about 12 in. long, ripening off very early; stem pale green; leaflets broad, flat, very pale green; flowers not opening; tuber medium size, half-round, flat; surface uneven; eyes large, deeply sunken near crown end; skin smooth, very clear, pale straw-coloured; flesh firm, white, of excellent quality for early use; moderate cropper. One of the very earliest of Potatoes. First-class certificate, 1874.

**Cattell's Late Nonpareil** (Cattell).—This resembles Paterson's Victoria.

## § 3. *Round.*

**Regents.** Synonyms, York Regent, Mitchell's Prolific, Early Oxford, Pink-eyed Regent, Rintoul's White Don, Scotch Don, Rusty Coat, Rough Jacket, Early Chinese (Veitch), Early White, Round Erfurt (Veitch), Early Don, Gryffe Castle (Harrison).—The above are varieties of the true Regent Potato, varying somewhat in point of earliness, and in cropping qualities. This, it is believed, is more due to change of soil than any permanent distinction. This is, perhaps, the best and most generally useful Potato in cultivation.

**Henderson's Prolific** (Farquhar).—Haulm spreading, moderately robust, 2 ft. 6 in. long; stem pale green; leaflets pale green, rugose, resembling those of a Regent; flowers pale lavender, fertile; tuber below medium size, round; form even, regular; eyes full; skin clear, slightly rough; flesh pale straw-coloured. A good useful early Potato. Great cropper.

**Tullinamoult** (Farquhar).—Haulm moderately robust, 21 in. long; stem tinged purple; leaflets small, crumpled, withering early; flowers abundant, purplish-white, fertile; tuber below medium size, round, flattened at crown end; eyes rather deeply sunken; skin smooth, pale; flesh pale straw-coloured, firm. Moderately prolific. Second early.

**Early Dimmisk** (Farquhar).—Haulm gross, spreading, 2 ft. 6 in. long; stem pale green; leaflets large, broad, pale green; flowers do not open; tubers very large, about five or six produced at each root; of form somewhat irregular, rounded, hollowed at stalk; eyes small, full; skin rather rough, pale; flesh white, firm, of excellent quality. Second early. First-class certificate, 1874.

**Irish White** (McGann).—Haulm like that of strong Regent; flowers not opening; tube medium round; eyes small, very deeply set, giving the tubers a nobbly appearance; skin pale, smooth; flesh white, firm. A fair cropper. Late second early. A hardy vigorous Potato.

**Lockloy's Perfection** (Burslem).—Haulm robust, spreading, 3 ft. long; stem pale green; leaflets rugose; flowers not opening; tuber large, rounded, much flattened; eyes chiefly situate at the crown, deeply sunken; skin rather rough, pale; flesh white, firm. A fair cropper. Mid-season. A coarse-looking Potato.

**Prize of Holland** (Veitch).—Haulm moderately robust, 27 in. long; stem pale green; leaflets small, rugose, green; flowers lavender and white; tuber small, round; eyes small; skin nearly smooth, pale straw-coloured; flesh yellow-coloured, small, and very inferior. Second early.

## Series II.—Skin Red.

### § 1. *Long or Kidney-shaped.*

**Rice's Seedling** (Farquhar).—Haulm very robust and gross, 2½ ft. long; stem green; leaflets bright green, pointed; tuber large, long-rounded, producing very numerous small ones, very uneven; eyes small, deep, scattered; skin rough, faintly shaded pink; flesh white. A very coarse sort.

**Early Red Kidney** (Dean).—Haulm slender, spreading, 18 in. long; stem pale green; leaflets small, pale green, ripening early; tuber long, slender, of a true kidney shape; eyes few, small, full; skin smooth, pale red; flesh close, yellow. An early sort. Great cropper, and worthless.

### § 2. *Round.*

**Welbeck Red** (Tillery).—Haulm very robust, 4 ft. to 5 ft. long; stem tinged red, leaflets rather small, pointed, rugose, light green; flowers purplish-white, fertile; tuber medium; form even, round; eyes small, deeply-placed; skin rough, pale red; flesh white, coarse-grained, good for late use. A great cropper. Was raised from Scarlet Prolific. Late.

**Rufus** (Harrison).—Haulm very robust and gross, 3 ft. 6 in. long; stem tinged red; leaflets large, pale green; grows very late; flowers white, abundant, fertile; tuber medium-sized, form regular, rounded; eyes small, full; skin very rough, deep red; flesh close, yellow. A handsome Potato, and a great cropper, but too coarse. Late.

## Series III.—Skin Purple or Blue.

### § 1. *Long or Kidney-shaped.*

**Précoce de Rémy** (Veitch).—Haulm straggling, slender, 2 ft. 6 in. long; stem reddish; leaflets small, rugose, deep green; flowers not opening; tuber small, true kidney-shaped; form very even;

eyes small; skin dull, purplish-red; flesh close, yellow. A poor cropper, and very worthless. Second early.

**True Blue** (Dean).—Haulm slender, spreading, 18 in. long; stem reddish; leaflets small, rugose, deep green; flowers white, fertile; tuber long, narrow, kidney-shaped; form even; eyes small, level with surface; skin rather rough, deep purple; flesh white, firm. Handsome. A moderate cropper. Second early.

**Purple Ashleaf** (Farquhar). Synonym, Stafford Hall.—Haulm moderately strong, resembling Kentish Ashleaf, spreading, 18 in. long; stem tinged purple; leaflets small, rugose, pale green; flowers not opening: tuber above medium size, long, flat; form very even, kidney-shaped; eyes very small, full; skin smooth, reddish-purple; flesh pale, with a dark streak through, close. A handsome-looking Potato, and a fair cropper, but of second-rate quality. Early.

### § 2. *Round.*

**Compton Surprise** (Bliss & Sons).—Haulm very robust and gross, 18 in. long; ripens off early; stem green, tinged with red; leaflets very large, broad, pale green; flowers white, sterile; tubers large, long, flattened, coarse in appearance; eyes numerous, very deep, scattered over entire surface; skin smooth, dark purple; flesh white, firm. A moderate cropper. Mid-season.

**Scotch Blue.** Synonyms, Duncan's Seedling, Summer Hill Seedling, Birmingham Blue (Dean).—Haulm moderately robust, spreading, 18 in. long; stem reddish; leaflets broad, green; flowers not opening; tuber medium-sized, round; form even; eyes small, few, sunken at crown, which is depressed; skin smooth, reddish-purple, deep purple in the eyes; flesh white, firm. Moderate cropper. Greatly resembling Scotch Blue.

**Surprise** (J. White).—Haulm very strong, 2 ft. 9 in. long; stem reddish; leaflets small, rugose, deep green; flowers purple, fertile; tuber medium, round, flattened, depressed at crown, form pretty even and regular; eyes small, sunken; skin smooth, deep reddish purple, deep violet round the eyes; flesh white, firm. A good productive sort, and handsome. Late.

**Skerry Blue** (Sutton).—Haulm very robust and vigorous, 4 ft. long; stem reddish; leaflets small, rugose, green, with red veining; flowers dark purple, very abundant, fertile; tuber large, round, of coarse, uneven appearance; eyes large, deeply set; skin rough, dark purple; flesh close, yellow. A great cropper, and a hardy Potato, but very coarse. Late.

## Series IV.—Skin Streaked or Flaked.

**Barron's Perfection** (Farquhar).—Haulm moderately robust, erect, 2 ft. long; stem green; leaflets small, rugose, pale green; flowers purple, very abundant, fertile; tuber medium, long kidney-shaped, blunt at crown; eyes small, few, mostly situate at crown; skin smooth, occasionally rough, pale straw-coloured, generally flaked with brilliant crimson near the crown; flesh white, close, of good quality. Very pretty. Moderate cropper. Second early. First-class certificate, 1874.

**Cattell's Advancer.**—Haulm robust, almost erect, 3 ft. long; stem pale green, tinged purple; leaflets broad, rugose, deep green; flowers darkly purple, fertile; tuber medium, half-long, flat; eyes small, deeply set; skin pale straw-coloured, oblong, with a dash of purple near the crown; flesh white, firm. A moderate cropper. Late.

**Red Breadfruit.** Synonym, Old Scarlet Keeper (Taylor).—Fit for use late in spring.—*Royal Horticultural Society's Journal.*

## The Potato Disease.

By William Tillery, Welbeck.

It is said that the Potato disease was prevalent both amongst the wild and cultivated varieties in South America long before it reached our shores; and in Germany Von Martius has described it under the name of the "moist gangrene," and as having done great injury to the crops there from 1830 to 1841. In the United States of North America, and in Canada, it was likewise detected a few years before 1845, the year when it first appeared most virulently on the Continent, and in the British Islands a month or two later. A microscopic fungus or mildew, now named *Peronospora infestans*, is known as the minute parasite attendant on the disease, but whether it produces it, or only appears as an attendant after the mischief begins, remains yet to be discovered. From the experiments of De Bary, it is stated that he has produced the disease by placing the spores of the Fungus on the leaves of healthy-growing Potatoes; and, if this is found to be correct by other experimentists, there can be no doubt as to the cause. At the present time, however, we only know that it generally appears in wet summers, about the middle of July, all through August, and in the beginning of September; and that in a certain stage of the Potato's growth—namely, about the ripening period—any experienced grower of Potatoes, who has studied the disease for any length of time, can tell to a few days when his crops will be stricken by it. This always occurs in very wet weather with a high temperature, and if thunderstorms prevail during the time, with the atmosphere close and sultry, the black specks on the leaves and haulm will spread more rapidly; but that electricity is the principal cause of it, is, I think, "not yet proven."

**Fungus Rest-spores.**—Some experiments were made in 1846 by me in fumigating the sound and diseased Potatoes, on purpose to destroy the rest-spores of the Fungus; the results, however, were not encouraging. A large close Mushroom-house in the garden was fitted up with shallow shelves, and the apparently sound and diseased tubers were placed on them in thin layers. The fumigation of them was done with chlorine gas and sulphur, in the following way: namely, 2 lb. of the black oxide of manganese and 4 lb. of common salt were mixed together, and put into saucers, and 8 lb. of sulphuric acid poured over the mixture to evolve the gas, which was kept close in the house for a few days. Afterwards 3 lb. of flowers of sulphur was ignited, and the fumes of it kept close in the house for three hours, making a sufficiently strong dose to destroy the spores of any fungus it could reach. All the tubers which had been fumigated, and were fit for planting in the spring of 1847, were planted in a field of fresh soil prepared on purpose for them; but, at lifting time, the crop was found as diseased as the others not operated upon in another field. The cost of preparing the chlorine gas and sulphur was as follows:—2 lb. of black oxide of manganese, at 4d. per lb., 8d.; 8 lb. of sulphuric acid, at 4d. per lb., 2s. 8d.; 3 lb. of sulphur, at 4d. per lb., 1s.; 4 lb. of common salt, at 1d. per lb., 4d.: total, 4s. 8d. A new parasitic mildew, the Oïdium Tuckeri, has of late years attacked the cultivated Grape Vine, but gardeners can now conquer it by dusting flowers of sulphur on the foliage and young bunches of the Grapes when it first appears on them, and by paying proper attention to the ventilation of their vineries. With the Potato plant, however, it is quite different, for if the rest-spores of the fungus be deposited in the inside cells of the tubers, no dusting, dipping, or fumigation will destroy them. In 1848, when the late Lord Howard De Walden was our ambassador at Lisbon, he sent from Portugal three tons of a red Kidney Potato—a variety which was warranted never to have had the disease there. They were all kept for setting, and planted in the spring of 1849 in a field of newly-broken-up light forest soil. In the same field were planted some of a strong-growing kind, named the Farmer's Profits; and at lifting time they showed less of the disease than the Portuguese variety. Now, if these red Kidneys never had the disease in Portugal, there could have been no rest-spores in the tubers, nor in the soil, for the field had never grown Potatoes before. To show that the infection did not proceed from being planted in the same field with the other variety, some of the Portuguese Potatoes were planted in a plot by themselves, and not near any other sort, and they proved quite as diseased as the others at raising time. Under shelter of a glass-covered wall here of great length, and used principally for growing orchard-house fruit trees, some experiments have been tried by me in growing Potatoes of both early and late varieties, to see if the disease would appear on them when grown under glass. In 1872, when the trials first commenced, no disease appeared on any of the early kinds grown in pots, and which ripened in May and June; but in the end of July a row of Rivers's Ashleaf planted out in the border showed slightly some specks of the mildew on the leaves, though when the tubers were lifted they were not in the least infected with it. Some Tomatoes fruiting at the same time in this erection were likewise attacked in the fruit with the black specks of the disease, but not on the foliage. A row of Dalmahoy Regents was plant-late in May in the border of the same house, to see if the disease would appear on them in September or October, but they were lifted quite sound in November. This year, in the same structure, some more experiments were tried by me in growing both very early and late Potatoes in a very moist state by frequently syringing them, as well as watering their roots with liquid manure made from horse-droppings, and full of ammonia. The earliest kinds were planted in the border in the beginning of February, and were frequently syringed on the tops and watered at the roots with this liquid manure, to see if the disease would appear on them at the ripening period in May. I suppose, however, that the temperature was not high enough for its development, for they kept all quite sound till lifted. Another row was planted in April to ripen about the period of the earliest planted in the open air in July, and a still later row to ripen in August and September. They were all grown in the very rich soil of the border, and kept well watered with the liquid manure at times, but no rain ever reached them all the time of their growth, and on lifting them no diseased tubers were found in any of the rows.

**Dry Seasons v. the Disease.**—From the above experiments it would seem that if we could keep our Potato crops free from rain in very wet summers, and from other atmospheric influences during their ripening period, they would be safe from the disease. As this, however, cannot be done, the next palliative is to plant them in the driest and best soils, and to give them more space in the rows, for the circulation of the air to keep the haulm and foliage drier in wet weather. That the influence of wet and dry summers has a great effect on the Potato disease is now sufficiently known to all growers of them. In 1845, the year in which the disease first appeared in the British Islands to any extent, the months of June, July, and August were excessively wet, the rainfall here being nearly 12½ in. In August alone the rainfall was 6½ in., with a high temperature at times during the month ; and had the peculiar signs of the disease been known then as now, there is no doubt but that it would have been detected sooner than it was. By the end of September the crops in the fields were all dead on the tops, and on taking up the produce of a field of nine acres, on the 9th October, the tubers were found to be quite one-half diseased. In 1846, the year of the Potato famine in Ireland, the month of August was again very wet, 4½ in. of rain having fallen here during its course, with frequent thunderstorms, and the temperature high when they occurred. The disease again appeared virulently by the end of August and beginning of September, and there was a great loss in the crops at lifting time. In 1848 there was a rainfall here of 35 in. (the average annual rainfall being about 25 in.), the months of August, September, and October being very wet. In August there were twenty-one rainy days ; and from the 21st till the end of the month frequent thunderstorms occurred, with an accompanying high temperature. In the beginning of September the disease appeared in its worst form amongst the late varieties of Potatoes in the fields. In 1852 another very wet year was registered here, but the rainfalls in July and August were much below the average, and the mean temperature being rather low, the disease was not so general, nor so virulent, as in other wet years. In October, November, and December, however, the rainfall was excessive, nearly 12 in. having fallen, and the usual quantity of winter Wheat could not be sown on strong soils. The result was, therefore, a most deficient Wheat crop in 1853. In 1860, when the next very wet summer occurred, the rainfall here, in July, August, and September, was above 11 in., of which more than 5 in. fell in August. The temperature, however, in these months was much below the average, with no thunderstorms or sultry weather, and the disease was, therefore, not so general as usual in wet years. In 1861 and 1862 the disease was again very general and bad; and in the very wet autumn of 1867 there was a great loss sustained by all growers, from its attacking their field Potatoes later than usual, and from supertuberation from a second growth. Perhaps the disease was never more general and virulent than in 1872, for it appeared early in July amongst the early kinds of Potatoes, and all the late crops were hopelessly stricken by it before the middle of August. From the 9th until the 14th of July there were thunderstorms with heavy rain every day, with the temperature nearly tropical, and therefore suitable for the development of the disease amongst the unlifted early and second-early crops, and they were found a mass of rottenness when raised. The rainfall here in 1872 was 38·25 in., being the largest quantity I have ever registered in the thirty-six years of my keeping the register. In the present year the rainfall has been below the average, January and August being the rainiest months. In the spring both the early and late varieties of Potatoes were planted under favourable circumstances as regards the weather, and I never recollect in any year seeing better and sounder crops of the early kinds lifted. At all the local vegetable shows in this district it was remarked by the judges that better samples never came before them, being very large, clear in the skins, and disease of tubers at a minimum. In the latter portion of July and the first half of August the weather was very dry and warm, and suitable for ripening all the early and second-early kinds; and all intended for seed were stored free from disease. In the last portion of August, however, a succession of rainy days, with thunderstorms, occurred, and the disease attacked the late crops on wet soils and in low situations, but it is to be hoped that the loss will not be so great as in 1872, as the general crop is so good.

**Early and Second-early Varieties best.**—In the intervening years between the above-stated wet ones, the disease did little injury to the general crops of Potatoes, and in the particularly dry and warm summers and autumns of 1868 and 1870 it was only seen in a few damp and low localities; but it is particularly worthy of notice that it has appeared more or less every year since 1845. There is not the least doubt but that some of our best keeping early and second-early varieties of Potatoes can be thoroughly ripened in July, before the disease can attack them so as to cause much loss in the crops. This I have proved since 1846, by growing large quantities for consumption and for keeping; and in letters that year to the leading journals and the *Economist*, I promulgated this practice as the safest way of growing our Potato crops for the future. It is said by many growers that the early ripened sorts will not keep good or long enough to supply the markets with the mealy and good-flavoured varieties of the Lapstone and Regent sections. This may not be the case at present; but new seedlings, of first-rate properties as to keeping qualities, flavour, and early ripening, will soon be selected by nurserymen and other growers to sell to their customers. The following is a list of early and second-early varieties of the Kidney kind, which I have proved to be excellent croppers and keepers: namely, Mona's Pride, Myatt's Prolific, Veitch's and Rivers' Ashleaf, and a new sort, sent out by the Messrs. Lee, of Hammersmith, under the name of the Hammersmith Early Kidney. Of the round or pebble-shaped section of the early and second-early kinds, the best I have tried are the following:—Coldstream Early, Harbinger, The Clipper, and Champion (all three seedlings of Bell & Thorpe's); Styffe Castle Seedling, Headley's Early Nonpareil, Burfitt's Seedling, Daintree's Early, and Yorkshire Hero. Some other seedlings, raised by Messrs. Fenn and Dean, have been certificated by the Royal Horticultural Society, and they will doubtless meet the demand for good early keeping kinds when they send them out for sale. The American new sorts of Potato, which have lately been introduced into this country, are a very distinct race in their foliage and dwarf habit, and some of them are very early ripeners—such as the Early Rose, Prolific, and King of the Earlies. They are all good croppers, but some of them have a peculiar earthy flavour when grown on strong soils, and they are all as much subject to the disease as our own varieties in wet seasons. They evidently do best in warm dry summers; for this year, with me, Climax, Peerless, and Prolific have been excellent in flavour and very productive, and free from the disease. They will, doubtless, be very useful for crossing with some of our best sorts for raising seedlings of a dwarf habit and early ripening properties. All our best-flavoured mealy sorts are very subject to the disease—such as the Flukes, Lapstones, and Regents—and seedlings crossed between them and the American varieties might have a better constitution. I have no great faith in resorting to any of the wild varieties of Potatoes of South America for raising seedlings from, for in 1848 I raised some plants from Peruvian seeds, and when their tubers got large enough for use, I found them of bad flavour, and the disease attacked them in the same way as our native sorts. They were something alike in the foliage, and had the dull red skins and white flowers, of the American varieties lately sent out. Although no kind of Potatoes can be said to be quite free from the disease in bad seasons, yet some are so little affected by it that a sound crop may always be reckoned on; and they all belong to the very late ripening varieties, with red leathery skins and strong woody haulm. Last year, when the disease was so prevalent, I grew here good crops of the Red-skinned Flour-ball, Wood's Scarlet Prolific, and Millett's Manifold; and the stems kept green and growing till cut down by the frost. The qualities of these varieties, however, are not very good as regards flavour, being better roasted than boiled; but they keep well in the spring without sprouting, and are well adapted for feeding pigs or cattle, which is a recommendation.

**Desirability of raising Seedlings.**—Before the Potato disease appeared in this country, some favourite old varieties, which had been some years in cultivation, gradually wore out and disappeared, and new seedlings took their places. Some forty years ago I can remember, for field cultivation, the Red and White Dons and the Perthshire Rough Reds, so much run upon in the London markets, the Breadfruits likewise (the progenitors of the Regent section), and Taylor's Fortyfold, were favourite kinds; but they have all now nearly disappeared from the nurserymen's lists. In some seasons, then, there was a disease named the dry rot, or gangrene, which attacked the tubers; but it did not affect the general crop, nor cause any great alarm amongst growers of Potatoes when it did appear. At that time some of the varieties grew such immense crops of seed-plums that cartloads could have been gathered in the fields at lifting time; but we seldom now see any of the kinds seed so freely as they did then, unless in exceptionally warm summers. The Potato plant being an exotic, there is no doubt but that our changeable and wet climate has an effect on its constitution, and makes the raising of seedling varieties a necessity, as they seldom continue longer in cultivation than from ten to twelve years. Some of our best kinds—such as the Lapstones, Flukes, Regents, and the second-early Kidneys—reproduce seedlings of the same type, so that there is no fear of any degeneration in them. A few years ago, the late Mr. Paterson, of Dundee, raised some seedling varieties of great merit, which are still cultivated in quantities for the market; but they will gradually have to succumb to newer and better sorts.

**Storing Seed Potatoes.**—The keeping and preparing Potatoes for setting is a great point; and the best results have been recorded of early kinds, where the tubers have been "greened" in the open air before being stored for the winter. If they be packed in shallow boxes, with the eye-ends upwards, a great quantity can be put together in a small space; and, being allowed to sprout slowly by keeping them in cool places safe from frost, the shoots become stiff and hardy at planting-out time. No hurry is then required in the spring months for planting them out, until the weather and soil are favourable for that operation. These hardy-sprouted tubers, when set whole, and their shoots appear above ground, will withstand the spring frosts better, and come in earlier, than those planted in the autumn or in the early spring months. Of course it is not possible for extensive growers of late varieti to adopt this plan; but their Potatoes intended for setting might be placed thinly on the floors of outbuildings or sheds, and frequently turned to keep them from sprouting too much. Temporary sheds might likewise be erected for this purpose, the walls being made with thick turves and lined with dry Fern or straw, and the roof thatched with any waste materials to keep out the rain and frost. Doors should be made at each end, and opened for ventilation in mild weather, to prevent the tubers from sprouting too much.

**Planting and Manuring.**—Some recommend autumn planting, and it may answer in light soils if the precaution be taken to plant the sets deeper than they usually are, so as to be out of the reach of severe frosts. On strong undrained soils, however, I have often seen the sets rot in the ground, from grubs eating into them, and the crop suffered in consequence. Autumn-planted Potatoes, therefore, run more risks than the spring-planted, and they do not, as a rule, come in any earlier; so that the advantage of the system is not greater for warding off the disease. Very late planting in the spring is another panacea recommended by some enthusiastic growers of Potatoes, who say that, if they are not ripe enough in August and September, the disease will not attack them to cause any loss in the crop. One year I planted some rows of Myatt's Prolific in the middle of June on purpose to see if they would escape; but, on lifting them in October, they showed more diseased tubers than any I have yet raised. Some more rows of late varieties were planted at the same time as the Prolifics, and were showing sturdy growth until the frosts, on the mornings of the 29th and 30th of September, blackened all their tops, and the tubers were so small that they were not worth the lifting. That the manures used for growing Potatoes have a great influence on the disease is now well known to all cultivators of them. For the late crops, perhaps stable or farmyard manure, if well decomposed when used, is as safe as any. Ten tons of this manure applied per acre at planting-time to land in good condition, and a top-dressing of 3 cwt. of best guano mixed with the same quantity of wood or coal ashes put on in showery weather in April, will form an excellent stimulant for forcing on the crop. The cost per acre for this mixture will be about £4 13s.: viz., 10 tons best decomposed farm manure, at 6s. per ton, £3; 3 cwt. best guano, at 11s. per cwt., £1 13s.; total, £4 13s. Another good manure for strong soils, if they be rich in organic matter, is about 30 bushels of soot and 12 cwt. of salt mixed together, and put into the drills at planting time; this quantity will do for an acre, and the cost will be, for 30 bushels of soot, at 7d. per bushel, 17s. 6d.; for 12 cwt. of salt, at 1s. 6d. per cwt., 18s.; total, £1 15s. 6d. Guano, if of the best quality, is highly stimulating, and, when used in the drills, should be mixed with wood, peat, or coal ashes, at the rate of 4 cwt. of guano and 2 tons of ashes to manure per acre, at the cost of £3 4s.: viz., 4 cwt. best guano, at 11s. per cwt., £2 4s.; 2 tons best charcoal-dust or peat, at 10s. per ton, £1; total, £3 4s.

If coal ashes be used the manure will be cheaper. For light sandy soils salt is an excellent fertiliser, and it likewise forms a crust on the surface of the drills and keeps the high winds from levelling them. If used in the drills at the rate of 20 cwt. of salt and 12 bushels of soot per acre, the cost will be about £1 17s.: viz., 20 cwt. of salt, at 1s. 6d. per cwt., £1 10s.; 12 bushels of soot, at 7d. per bushel, 7s.; total, £1 17s. I have used the sulphates of soda and magnesia mixed with the nitrate of potash as a top-dressing in the following proportions, and at the cost of about £2 9s. 6d. per acre: viz., 1 cwt. of the sulphate of soda, at 18s. per cwt., 18s.; 1 cwt. of the sulphate of magnesia, at 18s. per cwt., 18s.; ½ cwt. of the nitrate of potash, at £1 7s. per cwt., 13s. 6d.; total, £2 9s. 6d. When this mixture was put on the drills in showery weather in April or May, it promoted the growth of an excellent crop of Potatoes, quite free from the disease, on very rich soil that formerly produced a very diseased crop. In growing the early and second-early varieties in gardens or fields where the soil has frequently been heavily manured, and therefore still retains quantities of organic matter, simple manures such as charred rubbish, decayed tan, or sawdust, will grow good crops of Potatoes at little expense and free from the disease. I always, however, find that whenever coal ash is used by itself or mixed, it has a great tendency to make the tubers have rough scabby skins; it ought, therefore, not to be used unless in small quantities. A new manure, under the name of "phospho-silicon," has lately been introduced by the Rev. H. Moule, and is said by him to be effectual in curing the disease. It will, no doubt, when known, be extensively used by growers of Potatoes, and duly reported on by them. In years when the Potato crops show much of the disease great care must be taken in picking out the diseased tubers, and only storing those which are sound or least infected by it. This can be done best by placing them on the floors of sheds or outbuildings, where they can be frequently examined and picked over, and afterwards covered with litter to keep them from the air and frosts till stored. Where a great quantity has to be stored this can only be managed by pitting them in ridges in the open air. When this is done, I have found layers of quicklime, or charcoal-dust and sifted coal ashes, when put into the ridges amongst the tubers, to be effectual in keeping them sound. The diseased tubers do not infect the sound ones, but they rot and bring dampness and heating into the pits, which the lime and charcoal dust dry up. The ridges must not be more than 3 ft. or 4 ft. wide at the base; nor more than about 3 ft. 6 in. high, in order that heating may not be generated in them, should the tubers be put in damp at storing time. It is a bad practice to put too much straw on the top of the tubers in the ridges when earthing them up, as it rots them and gives them a bad flavour.

**Our Future Potato Crops.**—As to the future of our Potato crops, and the wearing-out theory, the question has often been mooted whether we should not give over cultivating the noble tuber to the extent hitherto done, and find other substitutes for it. There is, however, no more reason in giving over growing the Potato plant than in not growing the cereals or any other crop of our food crops, for they are all subject to failures in bad seasons. After such a season of disease amongst Potatoes as we had last year, the same land has been planted again this year, with sets taken, in many instances, from diseased tubers, and the result is one of the best crops ever lifted of the early and second-early kinds. Unfortunately, owing to the wet weather prevailing in the latter portion of August, the late-planted varieties have been infected by the disease in low situations; but the crops of them being good, the loss will not be seriously felt, as in some years. That the plant is wearing out from being more diseased than formerly, or from the exhaustion of the soil affecting its vitality, is not warranted by experience; for I have known gardens where it has been grown every year on the same plot, or border, for more than a quarter of a century, and yet producing good crops in favourable seasons. This, however, would not be good practice for extensive growers to follow, such as farmers, with plenty of land for a rotation of crops, and who could find fresh soil to plant their Potatoes in every year. Subsoil-ploughing strong undrained soils, or digging them deeply, would be another help to ward off the disease, for it relieves such soils of their superabundant moisture. Giving more space in the rows than what is usually done, or growing such low plants as Carrots or Kohl Rabi in alternate rows, between the Potatoes, would lessen the danger from the disease. Cottagers should only plant the early and second-early kinds of Potatoes in their garden ground, leaving as much room between each row as to be able to plant in May and June Savoys, Broccoli, Brussels Sprouts, and Scotch Kale, the best and most profitable of all hardy vegetables for standing the severe frosts in winter. The Potatoes will gradually be lifted for use, and the last lot will be ripe enough to save for seed by the middle of July, when the vegetables can be all earthed up. There is a great risk in cottagers planting the late sorts of Potatoes in the rich soil of their gardens, for they are in general shaded much with fruit trees, and in wet summers the disease runs riot, and destroys all their crops. The farmers in the neighbourhood are often willing to let cottagers and others plant a few rows of late Potatoes on their fallows, for the sake of the manure they put on the land. This manure is generally made from horse-droppings and road-scrapings, mixed with house-ashes, and raises excellent crops of Wheat the year after. Owing to the present favourable season, and the good crops of early-planted Potatoes, the outcry about the disease will subside for a time, as it has done in former years. Another wet summer, however, will again show it as virulent as ever, and we ought to be prepared to make the loss as little felt as possible. As I have before stated, this I am convinced can best be done by planting for the main crops, as early as the season will permit, the *earliest-ripening* varieties of good keeping kinds. Every year's *experience*, since 1845, whether the summers have been wet or dry, has only confirmed this practice in my case; and I believe many growers are now of opinion that the system is the safest. Should men of science and practice conjointly discover that the parasitic fungus, Peronospora infestans, is the cause of the disease, then it will have to be found out how the rest-spores of the fungus are preserved for continuing the life of the species in a new season. We may then be able to find a cure for it by steeping or dressing the sets intended for planting, or if in the soil, by using manures likely to destroy its development. If the conditions, however, out of which it originates, be atmospherical, of which there can be little doubt, we shall then have to depend upon the seasons for the only cure.

**Lord Cathcart's Prize.**—In the competition for Lord Cathcart's prize for a treatise on the Potato disease, none of the essayists were successful; and the judges' report says, "As regards the botanical part of the subject, it must be confessed that all the essayists appear to be in arrear of the present state of scientific knowledge." From this it appears that none of the essayists were regarded by the judges as good botanists; but that botany will have much to do with the discovery of the cause of the disease is doubtful, and the present state of scientific knowledge has added as yet very little to our knowledge concerning it. The judges, however, recommend the Council to apply the £100 prize to some competent micrologist, so as to induce him to undertake the life-history of the Potato fungus: even if this be done, it is not likely to lead to any great result. The life-histories of the mildews which attack the Pea and the Turnip crops in the dry warm autumns, and the Vine in spring and summer, must be known to micrologists before this; but no applied cure prevents these mildews from regularly appearing in years when the weather is favourable for their development. Another recommendation of the judges to the Council is to award valuable prizes for the best disease-proof early and late Potatoes. These prizes are not to be awarded till after a three years' trial of their resistance to the disease; and besides, they must have good cropping, keeping, and cooking qualities. From a quarter of a century's experience with early and second-early varieties, I have found that none of them are disease-proof, being only so when ripened in July and early in August, before the disease appears. As to the late sorts, it is only a few, that have thick leathery red skins and strong woody haulm, which resist the disease; and I believe as much is known about them already as will transpire after the three years' trial. New seedling varieties, however, of this section, with better cooking qualities, would be worthy of prizes.

**Change of Soil.**—The changing of Potatoes, for setting, from one description of soil to another, has a marked effect on their cropping and other qualities. I have found that a good change is made by setting those grown on a peat or boggy soil on light sandy ones, and *vice versâ;* and likewise by setting those grown on light soils on strong loamy ones. This year I planted a quantity of a ro mealy variety, free from disease, and grown in Prussia. The crop turned out excellent, and when lifted in September, not a diseased tuber was found among them.

**Potato Beetle.**—Although the Colorado beetle has not yet made its appearance in this country, it is said to be steadily working its way eastward, and we know not at what moment it may cross the ocean; it can do no harm, therefore, to give a remedy for this formidable pest. The best one that can be recommended is Paris green, known better in this country as Scheele's green—*i.e.*, arsenite of copper, mixed with ashes or flour in the proportion of 1 part to 12 or 15 parts. It should be dusted over the plants in the morning when the dew is on the foliage, and should always be repeated after rains. Three pounds of Paris green to about 40 lb. of flour, ashes, or air-slaked lime, will be enough for one acre of Potatoes.

## The Radish

(*Raphanus sativus*).

For our first Radishes we were indebted to China, whence they were introduced into this country about the fifteenth century. Their value was at once recognised, and they soon spread over all parts of the country, until even the smallest cottage garden had its bed of Radishes. A warm, moist soil suits them best, but they may be grown in any ordinary garden soil.

**Culture.**—Sowings may be made from February to December; but both early and late crops must have the warmest border available, and be protected during severe weather, whilst summer crops may be advantageously grown in any shady position. The seed is generally sown broadcast, and the seedlings thinned out when large enough to handle. These thinnings, when washed, make an excellent salad, and are by many preferred to the root. From April until September sowings may be made every ten or twelve days—*i.e.*, if a continuous supply be needed. To have Radishes in the best possible condition, they must be grown quickly; and to do this frequent waterings during dry weather must be given them, otherwise by the time the roots are of a usable size they will generally be pithy and ill-flavoured. Small sowings in quick succession are, therefore, preferable to large ones made at long intervals apart.

**Forcing.**—Where Radishes are forced, the seed is generally sown on hotbeds between rows of Potatoes, Carrots, etc.; or where there is plenty of accommodation, they may be allowed to occupy frames by themselves; the former plan is, however, a good one, and the Radishes are not detrimental to the other crops, being used before they have attained a sufficient size to be injured by them. In this case the seed is sown in drills, and the seedlings, when large enough to handle, are thinned out to distances of about 1 in. apart. Frequent waterings and weedings are all that is necessary after the plants have been thinned. Radishes may also be successfully forced by sowing the seed in large boxes filled with light, rich soil, and placed in warm houses or pits.

**Varieties.**—As regards varieties, they are now numerous, those most in use being the Turnip-rooted kinds (for forcing and early crops out of doors), and the Long-rooted sorts, such as Wood's Early Frame and Early Scarlet Frame, Scarlet Short Top, etc. These are all good in flavour, and bright scarlet—a colour which renders them more valuable than the purple and white kinds, which are only fit for growing for their leaves, which are large and tender. The Turnip-rooted kinds are most suitable for summer use; there are several varieties which, however, differ but very slightly from one another except in colour; there are scarlet, white, rose-coloured, and purple—the two former being the kinds generally grown. The black and white Spanish are grown for winter use—these sorts being much more hardy than other kinds—but they are inferior in quality, being large, hard, and hot. A Japanese Radish called the Daïcon is largely cultivated in all parts of Japan. It appears that its roots often reach nearly 1 yd. in length and 1 ft. in diameter. The colour is a milky white, tinged with yellow; the very thin skin is easily removed, and the compact, juicy flesh has the delicate flavour of our best small Radishes. In Japan they are prepared for the table in various ways—baked, sliced very thin in salads, or preserved in salt. In the latter form it is used to season boiled rice. No doubt these Radishes are allied to the large and tender Chinese Radish, which Chinamen cultivate so much, both when at home and in other lands.

**Culture in Market Gardens.**—The only Radishes grown in the market gardens about London are the red Turnip and Salmon (a long-rooted kind), and the white varieties of both these sorts: but the majority are red. These constitute the principal winter crops in the market gardens, the first being fit for use early in December, the second three weeks later, the third in the second or third week in January, and others from that time till the end of March or middle of April,—an interval of about three weeks elapsing between each succession. The empty space at command, the character of the season, the succeeding crops, and other circumstances, determine the number and extent of the Radish plantations. Where a great extent of land can be cleared and sown at one time, the sowings are fewer than when only a small space can be cropped, and where, on an average, four or five successive plantations constitute the number grown. Radishes do not grow well in summer, the weather being then too dry and parching for them; but in a moist season they may be grown even then with advantage. If the weather be moist, a sowing is made in August on a cool piece of ground, and another a fortnight or three weeks afterwards. They are usually grown on ground that has just been cleared from Vegetable Marrows, French Beans, Seakale, Rhubarb, or Celery. The first two crops are usually grown under fruit trees; by sowing time the trees are leafless, and whatever pruning they may have required will have been given them; they therefore do not shade the plants, but, on the contrary, shelter them a little, and before the *leaves begin to* grow in spring the Radishes are marketed. The ground, after having been dug or trenched, and manured if necessary, is lined off into beds 4 ft. or 5 ft. wide, having 1-ft. alleys between them. The seeds are then sown, raked in with wooden rakes, and also slightly covered from the alleys, and rolled. About 3 in. in depth of rank litter is then strewed over the beds, and left there until the seedlings appear, when, if the weather be fine and not very frosty, they are uncovered during the daytime and covered at night; but during hard, frosty, and snowy weather, they are kept covered even during the daytime. All the sowings are treated in the same manner as regards covering and uncovering; and after the middle of February, if the plants be strong and the weather mild, the coverings are dispensed with, but kept in the alleys in case of emergency. Radishes, in their rough leaves, will stand a few degrees of frost with impunity, if the ground be not very wet. In April, the litter used in covering is removed and built into a large stack, to be converted into manure. The March and April sowings require no covering. Birds are very destructive to Radishes from the time of sowing until the plants have made rough leaves: they eagerly devour the seeds before they germinate, and look after the husks after the seedlings appear, pulling up the young plants to effect their purpose. In order to counteract this mischief boys are kept to watch and scare away the birds. In March the first outdoor Radishes are fit for market, the largest being pulled up first, leaving the others for a week or two later, in order that they also may become marketable. When drawn they are tied into little bundles, bound round with a withy, or piece of bast, washed after being bunched, and packed into baskets for market. After Radishes may be planted alternately Seakale and Lettuces, Cauliflower and Lettuces, preparations being made for Celery, Beet, Vegetable Marrows, French Beans, or any other crop suitable for the situation. Autumn Radishes are treated in the same way as those for spring use; but, as has been stated, the litter coverings are not used except in the case of hot, dry weather. When Radishes are wanted earlier than those of the December outdoor sowings, they are obtained from gentle hotbeds, made up about the 1st of January. These hotbeds are of two kinds—one the common frame hotbed, the manure being in sunk trenches; and the other merely a sunk bed of manure, covered with a few inches of soil, and mulched over, like the outdoor beds.

## Rampion

(*Campanula Rapunculus*).

THIS plant, though a native of Britain, is seldom seen in English gardens; its usefulness is, in fact, so limited, that only in places where salad is urgently needed in large quantities during the winter months is it worth growing. The root is the part used, which, to be in perfection, should be large, white and tender. Sometimes, however, the leaves are blanched and used in salads in the same way as the roots, excepting that the latter are generally cooked previously. The seed may be sown in drills or broadcast; in either case it should be but slightly covered with finely sifted sandy soil. The first sowing may be made in April, or even earlier; but the plants are very liable to bolt or run to seed, in which case the roots as well as the foliage are rendered useless. Any time during May, June, or July, sowings may be made with every chance of success. Previous to sowing, however, if the ground be dry, a good watering should be given, to obviate the necessity of doing so after the seed is sown, which, owing to its being so fine and small, would probably be washed into patches were watering done immediately after sowing. It is advisable to mix the seed with lime or silver sand, in order that it may be more plainly seen and therefore admit of being more regularly distributed. When the plants begin to crowd each other, they should be thinned out to 6 in. apart each way; after which gently stir the soil between the remaining ones, give a good watering to again settle the soil around the roots, and keep clear of weeds. The roots will be fit for use in the autumn, and may either be taken up and stored away, in a similar manner to Carrots or other roots, or be protected from frost by covering with ashes or other material, where they have been growing. The former plan is, however, considered the best.

## Rape

(*Brassica Napus*).

THIS is seldom grown, except for use in small salads; for which purpose it is very useful, inasmuch as it may be grown at any season of year, provided a corner in a warm house or pit can be spared for it during the cold months. The same treatment usually given to Mustard and Cress will suit Rape, and they are all cut and used in much the same manner as each other.

## Rhubarb

(*Rheum*).

THIS, though theoretically a vegetable, is practically a fruit, its leaf-stalks being used in cookery in the same manner as other fruit—as in tarts, puddings, preserves, etc. It forms one of the principal fruits of the cottager, as well as an important one to the gentleman's gardener. There are now many first-rate kinds in cultivation, some of which are best suited for wine-making, others for forcing, etc., etc. There are some varieties of Rhubarb, such as Rheum australe, that are useful only for the ornamental character of their leaves, or for covering baskets of fruit, etc. The leaves attain an enormous size, and are therefore useful for the purposes mentioned. The purgative character of the leaf-stalks renders them unfit for general use. The roots of Rhubarb are largely used in medicines, for which purpose they are very valuable.

*Varieties.*—The principal varieties of Rhubarb are—Vic very large and fine, a good general sort; Tobolsk and Prince Albert, very early kinds, and good for forcing; Linnæus and Early Prolific, excellent kinds for either forcing or outdoor culture.

**Culture.**—Rhubarb will grow on many kinds of soil; but the richer and deeper it is, the finer will be its quality and the larger its size. The situation should also be moderately dry, or made so by drainage. It will grow in clay, peat, or the bog-earth of the Fens. We have seen it succeed remarkably well in mud cleaned out from the river. Perhaps, had it a choice, it would elect, like most other garden plants, a turfy loam, leaning to clay rather than sand. When the leaves get fairly into growth, it needs some strong stimulant to keep them growing. The larger the leaves of one season the stronger will be the crown for the next; hence the importance of rich feeding all through the growing season. It is a good plan in small gardens to plant Rhubarb near the depôt for house sewage, so that it may be nourished with strong waters as well as rich solid manure; 4 ft. at least, of a rich root-run should be provided for it. For new plantations the ground should be thoroughly trenched, and the manure carefully incorporated with it. Its productive force should be kept up afterwards by an annual dressing, from 4 in. to 6 in. in thickness. No plant is more easily increased and multiplied than Rhubarb; plants of two or more years old seed freely if permitted to do so. Unless seed be required, however, they should not be allowed to do so, as seed-bearing weakens the crowns. The seeds ripen about the end of September, and may be sown at once in shallow drills a yard apart, or they may be sown in February. As soon as they are well up, thin the plants to 18 in. or 2 ft. asunder, according to the size of the plant and the intention of the cultivator. If intended to remain where they are, a yard apart is close enough—indeed, too close for the Victoria variety. Some, however, prefer rows 2 ft. apart, and thinning the plants to 1 ft. only the first season; then in the October or February following fresh ground is prepared, and the Victoria transplanted at distances of from 4 ft. to 6 ft. by 4 ft., and the Defiance 3 ft. by 18 in. or 2 ft. The best plan is to sow Rhubarb where it is to remain, as it forms immense roots that are easily broken,—and to break it is to injure it more or less. Nevertheless, a very common mode of propagating Rhubarb is by root division. The huge stool or fleshy root is sliced into as many portions as there are crowns to it with a sharp knife or spade, and each slice forms a new plant. This is rather a barbarous mode of increase. Gathering Rhubarb, and when to cease gathering, are matters which require more attention than they generally receive. In gathering, the proper method is to give the leaf-stalk a twist outward, and a sudden jerk down at the same moment. From want of attention to this, many tear off the crown with the *base* of the leaf-stalk. Again, too many leaves should not be *gathered at once.* If a plant have only a dozen leaves, do not *gather more than* six of them, and let these be the lowest. As to the age of the stalk, that depends a good deal upon taste. Some prefer Rhubarb when the leaves are freshly unrolled, others when they are half-grown, and others when they are fully grown. Of course there is great waste if the stalks be gathered before they have reached their full length. Rhubarb is at its best just when the leaf has reached full size. It can hardly be too old for preserving, and is seldom gathered till the end of August for that purpose. As to the time of ceasing to gather Rhubarb, it should certainly be not later than August if the gathering is to be annual: this leaves but little time for the last leaves to ripen good crowns for the next year's crop. All the leaves removed have doubtless been a loss to the plant: they did much to weaken and nothing to strengthen it; it is only the leaves left on that recoup it for its loss in those taken off. Hence the importance of rich food to replenish the plant, and time for the maturation of the later growth; and it need hardly be said that no weed must be permitted to grow at the expense of the Rhubarb plants. Grown as here briefly set forth, perhaps no crop yields a heavier or more profitable return.

**Forcing.**—Rhubarb may be forced in an early Peach-house, in a Vinery, Mushroom house, Cucumber house, or under pots or boxes, —and in all cases successfully; but the following simple method is perhaps the best, inasmuch as it produces plants which are more easily gathered, and superior in quality to those produced by any of the methods just named. About 3 ft. of the soil in which the crowns are growing are left as a bed, on each side of which a trench 2 ft. deep and 2 ft. wide is dug out, and filled with half decomposed horse-manure firmly compressed. When this is done, in order to form a span-roof, three, four, or six equilateral triangles are put over the bed, the bases of which are supported on bricks, or are driven into the ground on the outer edges of the bed, and held together at convenient distances by means of a beam or plank run along their tops. Short narrow boards are then laid (about 3 in. or 4 in. apart), sloping from the outer edges of the ridge to the top beam; and, finally, the whole is covered with a sufficient quantity of manure or leaves to raise a good heat. A few 4-in. drainpipes passing through the manure serve as ventilators, and are useful. As the stems become rather drawn when the temperature exceeds 60°, one end may be built up with litter, and the other used as a door,—a truss of straw will be most suitable for that purpose, provided it is sufficiently large to fill the aperture. The manure may be turned, and supplemented with more to keep up the temperature; but such addition is seldom necessary.

The general plan of forcing Rhubarb is to place long pots, with covers, over the plants in the open ground, covering the pots all round and over the top with fermenting material. This is good practice, but it cannot be produced so early by this means as those mentioned above. Many growers, after placing the pots over the crowns, dig a trench all round the roots—which trench is firmly filled with hot manure from the stable. This is done in addition to covering up the pots, and is no doubt of great advantage where early Rhubarb is required and there are no other available means of getting it.

**Rhubarb Culture in Market Gardens.**—Of late years this has become a much-sought-for and important vegetable, but half a century ago it was scarcely known in the London market. The late Mr. Myatt, of Deptford, is looked upon as being the first who grew Rhubarb in any quantity. The Deptford and neighbouring market gardeners at first thought that Myatt was mad upon the subject; but they soon found out that this was a paying job, though a mad one, and consequently they took to growing it, as also did the majority of the London market gardeners. Now, however, it is almost universally grown, and it is a very accommodating crop, requiring but little care or attention. The varieties grown consist chiefly of the Early Albert, Myatt's Linnæus, Myatt's Victoria, Red Champagne, and Johnson's St. Martin. Red Champagne is much sought after in the market, on account of its fine red stalks; and, when forced, its colour is brighter and more imposing than that of other sorts. The soil used for growing Rhubarb is a deep, rich, and moderately moist one; and the position is sometimes in exposed places, and at other times under the shade of fruit trees. The exposed positions are decidedly productive of the finest Rhubarb, hence it may be most desirable to adopt such; but under fruit trees this crop grows almost as well as anything else that could be planted; therefore, in order to economise this space, few crops probably pay better than this one. In the Rhubarb season, which is spring, that under the fruit trees grows well, and, as the trees are leafless, they do not shade them much. In sheltered corners, such as are to be found under fruit trees, the produce comes naturally into use about a week sooner than from the open field. In making new plantations, divisions of the old stools are used, and they are planted in rows 2½ ft. or 3 ft. apart, and from 2 ft. to 2½ ft. asunder in the rows. No leaves are cut away from them the first year, but the space between the lines is planted with Lettuces or Coleworts. During the second season many stalks are not cut; but in the third year a fair crop is realized. As soon as time can be spared in winter, and before the leaves begin to grow, the ground between the rows is dug over roughly, and a large forkful of rank litter placed over each crown. It would be difficult to take the litter into the plantation on a wheelbarrow, owing to the softness of the newly-dug soil; therefore the workmen carry it in baskets, either on their heads, or, if the baskets are large, in the hand—two people being employed to each of the latter. As a rule, however, some people are employed to fill the round vegetable baskets used, others to carry them on their heads, and a few more to empty their contents over the crowns of the plants. Under the litter the stalks come up clean, tender, and crisp—very much more so than if none were used. The leaf-stalks are pulled for market as long as there is a demand for them; and even in late summer large waggon-loads are often disposed of to jam manufacturers. In bunching the Rhubarb for market, a piece of board, padded with a piece of an old bag, is nailed to the bench in the packing shed, and into it four nails or pegs are driven, two withies being laid crossways for tying. The finest leaves are placed in the bottom, the top and ends being alternate, and over them some small ones, making up the outside again with large stalks, so that the small ones are entirely hidden. Rhubarb-forcing is very simple, and is done in hotbeds covered with hoops and mats. In making young plantations, the sets are sometimes planted about 18 in. apart each way; and, at forcing-time, every other row, and the alternate plants in the row left, are lifted for forcing; old plantations, too, are cleared entirely for forcing. The leaves will be decayed enough to be raked off by the middle of October, by which time the first portion is usually lifted for forcing. For this purpose trenches are cast out, about 4 ft. wide and 2 ft. deep, and filled with fermenting manure. Over this a thin layer of common soil is placed, and in it the crowns, after being trimmed of some of their rougher roots, are planted. Over the crowns some loose litter is strewed, and then the beds are hooped over and covered with mats, over which another layer of straw or litter is placed during winter. In the outside covering apertures are made at gathering time, and closed again when done. In February, if the weather be mild, the hoops and mats are commonly dispensed with. In the gardens of Mr. Bessent, at Mortlake, excellent Rhubarb is produced in pits, like deep Potato pits, with some heating material underneath, and some loose straw merely shaken loosely over them. Large quantities of the early Rhubarb in our London markets come from Yorkshire. It is forced by the warmth of the waste water from the boilers of the factories in the neighbourhood of Leeds and Bradford, and has become a useful vegetable in January and February.

That the cultivation of Rhubarb is a profitable crop in America, as well as in England, may be seen from the fact that a market gardener, near Providence, sold in that market during one spring and summer nine tons of Myatt's Linnæus Rhubarb from a quarter of an acre of land. Owing to very sharp competition, he only received £5 a ton for it, or about a halfpenny per pound. This is £45 worth of produce from a quarter of an acre, or £180 per acre. If it had not been for competition, and the Rhubarb had been sold at former season's prices, he would have received at the rate of £360 an acre for this crop. This, the *Agriculturist* says, is by no means an unparalleled return for such crops. It is a result of a very liberal use of manure and labour, and of adapting crops to the wants of the market. A farmer uses £10 worth of manure, and thinks he is very extravagant. A market gardener uses £40 worth on rich land, and regrets that he had not put on more.

## Salsafy

(*Tragopogon porrifolius*).

THIS plant, originally a native of the Mediterranean region, has been *long naturalised* in central and northern Europe. It i biennial of the Composite Order, with long, narrow, tapering leaves, and a long spindle-shaped root, which, when cooked, has a remarkable flavour of oysters, and is one of our most delicious vegetables.

**Culture.**—To grow Salsafy crisp and white in flesh like the Parsnip, a rich, deep, well-pulverised soil is required, that has been well manured for some other crop the previous year. It should be trenched in autumn or early winter, and thrown up into rough ridges to sweeten and get well pulverised by seed-sowing time. The following spring the ground should be forked down on a dry day between the middle of March and first week in April; drills drawn a foot apart, and the seed dropped into them thinly; the plants, after their appearance above ground, should soon be thinned in the rows from 9 in. to 12 in. from each other, and the ground should be kept thoroughly surface-stirred all the following summer. The return for this will be a crop of even, good-sized, clean-shaped roots, as large as a moderate-sized Surrey Carrot. On rich, deep, well-prepared land, if the roots be required to grow very large, it will be necessary to sow thinly, and have the plants a greater distance apart in the rows, with the addition of heavy manuring. By these means the object will be attained. If the manure be deeply buried, so that the tap root may run straight down to it to find it out—which it will do—the roots will grow as large as a good-sized Parsnip. If the manure be only buried shallowly, and intermixed with the soil in digging, forking, or trenching, scarcely a straight, tapering, well-formed root will be produced; but a parcel of rough, forked, ill-shaped bunches of roots will surely be the return. Although an old vegetable, long known and used in this country—and a very useful and good one too, for second course, served with white sauce, throughout autumn and winter—nevertheless it has not made that progress for culinary purposes it really deserves to have done. Since the Potato disease has been so destructive, it has got better known and more in use, but not to the extent it should have been, considering its usefulness as a vegetable that may be in constant use at least nine months in the year. It is one of the most valuable substitutes for the Potato, and a heavy weighty crop can be produced from any kind of soil. If prepared and managed as above directed, it would be a valuable root for a change at cottage gardeners' and tradesmen's tables. A few rows sown in an odd corner would produce many a good dish of wholesome food throughout winter. A plant or two placed in any corner for seed produces a succession of deep-purple flowers as pretty as those of many cultivated border plants. The roots can be taken up in autumn, and stored as Parsnips or Carrots, or left in the ground and mulched in winter. When lifting the roots, care must be taken not to injure them in any way, as they quickly bleed, and loss of flavour to the root is the result.

## Seakale

(*Crambe maritima*).

As Seakale grows on the stony and stormy western coasts of Europe and the Baltic, here and there on the almost equally inhospitable shores of the Black Sea, and along the coasts of England and Ireland, it is not likely to go wrong in a piece of ordinary garden soil in Britain; but, of course, the better the ground is prepared and manured, the better and stronger will the growth prove. The soil should therefore be enriched with whatever ordinary manure may be at hand, and trenched 2½ ft. or 3 ft. deep. If existing plantations be not in a satisfactory state, prepare the ground for a new planting as soon as convenient, and plant in spring, or, indeed, at any time between autumn and spring when the ground is in workable condition. No need for a stated time in planting such things as this during the dull months! All herbaceous plants may be moved with impunity from September to March; but it is unwise to attempt it unless the ground be unfrozen, friable, and in a convenient state for "working." In autumn and spring, the recognised times for planting, it may be that the very week we had intended to plant will see the ground saturated with water; whereas at Christmas it may be in "beautiful condition." And with herbaceous plants we may feel perfect confidence in removing them at any time when convenient, and when the ground is dry—that is, during the dark months. It is very desirable that the situation should be open, so that the plantation may get the benefit of full unobscured light. This caution is quite necessary, bearing in mind the great number of gardens made half under and near trees, much to the detriment of most things which they contain.

**Propagation.**—This is accomplished by seed, by division of old stools, or by cuttings from the fleshy roots. The seed should be sown in March or very early in April; but generally speaking most places will afford old stools or old plantations from which new plantings may be made, and sets may be bought ready for planting. They should be planted in lines at from 2 ft. to 3 ft. apart, and if to be forced in the old way (that is, where they stand), there should be a space of 2 ft. or so between the plants, so that each may be readily found under the usual bed of manure, or under a Seakale pot. The main object should be to make the plants grow as freely as possible, as the bigger the leaf the larger the bud, and the larger the bud the better the Kale. Pinch off all flowers in the bud, unless you want to save seed, and that is not likely to happen often. If the soil be liable to drought, a mulching or thin layer of some light, half-rotten manure, cocoa fibre, leaf-mould, old hops, or any fluffy material that may be most easily obtained, will do much good, particularly the season after planting, before the roots have reached down deep and got out of the way of surface drought. Most people cut off the crown or bud of the plant before *planting*, because if planted whole it would be likely to run to seed, and the secondary buds that spring out around it naturally have not that tendency at first. But it is of little matter, —indeed, none at all, provided you have a look over the sprouting plantation, and see that the buds inclined to run to flower and seed are nipped out early. Do not be satisfied with removing the flower-stems, but nip them out before there is anything of a stem to speak of. Although it matters little what mode of propagation is employed, it may be remarked that not a few of the old growers prefer sowing their seed in thin lines or patches, where it is to remain, and thinning out the plants to proper distances apart when they come up. When the Seakale, in its wild state, first begins to swell up through the sand in spring, it is delicious to eat; and it was thus that the west country people used to enjoy it, about a century ago, before it was introduced to our gardens.

**Forcing.**—Many who have not much help or stable manure, have been in the habit of waiting till Seakale came in naturally, deterred by the great expense incurred for Seakale pots. But these are all unnecessary. The best way is carefully to take up well grown roots, bring them indoors, and force them or make some little arrangement near the frames or manure-heaps for that purpose. A trench in a Mushroom-house will do admirably for forcing Seakale; so will a box made over a hot-water pipe; so will a pit or dark nook under the bench of a warm house,—or, in fact, any place in which a little warmth occurs. For instance, nothing is more common than to find a flue or hot-water apparatus heating some surface other than the interior of the house; and by placing the Seakale in a wooden box against this it may be forced most easily. There can be no difficulty in providing a suitable place for it if there are houses or frames or pits in the place. In places where there are no hothouses, the best way is to devote a box or little pit in some shed or outhouse to Seakale forcing, and in it to place 6 in. or 8 in. of horse-droppings, which will start the Seakale into growth. At Frogmore, Seakale is forced in a bricked trench sunk beside a chamber through which a number of hot-water pipes pass from a furnace to their destination. This trench is sufficiently heated thereby. It is about 1 yd. wide, and 2 ft. deep, and covered with a close-fitting wooden shutter, over which is placed some litter in severe weather. From this small trench they cut all that is necessary for the royal table. Wherever there is a proper Mushroom-house, one of the shelves may be advantageously devoted to the forcing of Rhubarb, Seakale, Chicory, etc. This is a most convenient way,—all that is necessary, in addition to packing the roots on the shelf, being to hang a piece of canvas or a mat before the bench to exclude the light. These remarks will suffice to point out how the forcing of Seakale may be most conveniently done. Any place affording a genial heat, and either dark or light, will do. Dig up the roots when forcing is about to commence, and put a portion in heat, following at intervals and in such quantities as circumstances and requirements may direct. Injure the roots as *little as possible* in taking up, and put by the long thong-like points in a bit of soil in a shed somewhere, to be put in as cuttings, or rather as plants, to succeed those taken up for forcing. Of course, to be blanched, the plants must be in the dark; but if we place them in a light stove to force, the blanching is easily accomplished by having a few inches or so of leaf-mould over the crowns. The temperature of the medium in which it is placed should range from 50° to 55°; in any case, the roots should be placed closely together to save space, fine leaf-mould or light earth being shaken between the interstices, and washed in with a gentle watering. Of course, a considerable number of plants may be taken up annually for this process, and the way to meet the demand is to make a young plantation every year, equal in size to the one consumed for forcing. It is a work of but little trouble; some people plant out the old plants that have been forced, and they come in again another day. Lifting is undoubtedly by far a more convenient and economical mode of forcing Seakale than that of covering the stools in the open air. But arranging for its blanching at the natural period is another matter: that is best effected by placing about 12 in. of some light, easily-obtained material over the crowns of the plants—say, cocoa fibre (as that would be capital if near at hand), or leaf-mould, sifted coal-ashes, or even earth dug from a trench between the rows. As for insects or diseases of any kind, there is no plant in existence less troubled with them. Many vegetables, requiring ten times the care and trouble and expense, are not nearly equal to Seakale; and, bearing in mind its hardiness, freedom of cultivation, cheapness—in fact, its every good quality—it is not half so plentiful as it ought to be throughout the country generally.

When Seakale is forced where it grows, the ordinary pots or boxes should be employed for the purpose; or even sticks 2 ft. long may be placed in an angular position round the plants and meet at the top, where they should be tied together, covering them up with fermenting material, such as leaves, fresh stable manure, or a mixture of both. Where leaves can be had in sufficient quantities, these are much to be preferred to all other material, as they afford a more gentle warmth, and are not liable to get too hot, or impart a disagreeable flavour to the Kale. In forcing under pots, the whole space between them should be filled up with fermenting matter, covering the lid with which they are provided to the depth of a few inches. When the whole is complete, two or three sticks, to test the heat, should be inserted in the heating material. These ought to be frequently examined, to see that it does not get too hot, in which case the produce is forced up too quickly, and becomes thin and weak, instead of having the short thick crowns of which well-managed Seakale consists. If the sticks feel a little warm, it is sufficient to produce Kale of 8 in. or 9 in. in length in five weeks or so from the time the material has begun to ferment Should there be any indication of too much heat, some of the fermenting material ought to be removed from the tops of the pots, so as to cool it. By this method of growing Seakale, [illegible] same roots will bear forcing in the beds in which they are grown for years, without replanting; but the produce is not usually so fine as when the roots are taken up and placed on a bed of leaves or other fermenting matter. For this reason, and the fact that much more can be grown on a given space—consequent upon the closer planting which the latter system admits of—it is to be preferred.

**Seakale on the Hampshire Coast.**—Between Calshot Castle and Leap wild Seakale grows luxuriantly on the beach, just above high-water mark, and those who live close to the shore claim so much of it as is opposite their domain. In autumn, when the stems die down, they cover each stool with shingle, to the depth of 18 in. or 2 ft.,—an operation which answers two purposes: it keeps the crown from being trodden under foot in winter, and when the Kale commences to grow in spring it blanches it. It is generally ready for use about the middle of March. A good harvest is made of it when fit to cut, which is just before it peeps through the shingle. The latter is carefully removed by the hand, so as not to break the tender stalks, which turn out quite clean and well blanched. It is sent to Southampton and Cowes, where it finds a ready market at 6d. per lb. Although all the crowns are covered at the same time they do not all come in at one time; for the cutting generally lasts three weeks. There is no reason why Seakale should not be grown on the coast everywhere—that is, where any space is left above high water for its accommodation—for it would doubtless grow on other parts of our shore as well as here. All who live in the neighbourhood of our seaport towns, where any beach exists above high-water mark, should sow some seed in the following manner:—With a shovel open a trench 1 ft. deep, if shingly; but, if sandy, half that depth will do; sow the seed in it as you would Peas; then fill it up, which is all that is necessary until the roots are large enough to be transplanted, which, if the seed be sown in March, will be in the succeeding March. Take the roots up as carefully as possible, and plant them in fours in squares 9 in. apart and 3 ft. asunder between the squares, which, if in lines, should be 6 ft. distant from one another. When covering the crowns for blanching, the shingle may be heaped up over them in ridges along the lines.

This Kale is generally well blanched, stout in growth, and in every way excellent; when cooked, the flavour is even more delicate than that of ordinary forced Seakale, and it often produces stems 9 in. long, each of which weighs 1 lb., and some 20 oz.

**Culture in Market Gardens.**—Seakale is a very important early crop to the market gardener. It is a crop easy to cultivate, accommodating in its habit, free from insect pests; and, altogether, it gives little trouble and is highly remunerative. Growers in the Fulham fields, the Chiswick and Barnes Thames level, the Deptford and Woolwich neighbourhoods, and, in fact, for many miles round the Metropolis, pay much attention to its growth, and regard it as one of their principal crops. From the first week in November till the end of April it is abundantly supplied to our markets.

**Propagation.**—The common way of increasing Seakale is from cuttings of the thong-like white fleshy roots, which are cut away from the crowns when these are lifted for forcing. These thongs, when removed, are thrown into a heap in a shed, there to remain until all the plantations that are to be lifted for forcing are up and dressed. The best are then selected, cut up into pieces about 4 in. in length, laid in a heap by themselves, and the remainder destroyed. Beds are prepared for the cuttings, from 4 ft. to 6 ft. in width, any length, and raised, like a seed-bed, about 4 in. or 6 in. higher than the surrounding level, to keep the Seakale roots healthy and free from damp. The cuttings are distributed 2 in. thick on the surface of the bed, and covered with soil 2 in. or 3 in. in depth. This being generally done in January, all is left undisturbed till planting time, which is commonly in March. The beds are then uncovered, and as the roots will have pushed several eyes, the top and bottom ends of the cuttings can easily be discerned, and all eyes are rubbed off excepting the strongest top one. Instead of placing the made cuttings on the bed used for starting them, some growers lay thereon selected, but uncut, roots, and at uncovering time cut back these roots to the best eye, then cut them at the required length below it, and rub off all other eyes, as in the previous case. By this plan good eyes are neatly and certainly secured; but the practice is more laborious than in the first case. Seakale, too, is raised from seed in some cases; but it is considered a tedious and almost needless way, considering how easily it is obtained from cuttings. Mr. Myatt, the famous market gardener at Deptford, propagates this vegetable from seed in the following manner:—In March he selects a piece of ground, digs it deeply or trenches it, but gives it no manure if it have been liberally treated in that respect for the previous crop; and thereon he forms a series of beds 4 ft. wide, with 1-ft. alleys between them. On these beds he sows his seeds thickly. The seedlings are left unthinned and unmoved during the succeeding summer and winter, no attention being paid to them whatever beyond cleaning. When the plants are twelve months old from the time of sowing, they are lifted, cut into 4-in. lengths, to which are preserved the crowns, the remainder being thrown away. These pieces are then planted permanently at once, and will be equally strong with the plants from root cuttings. The objection to seedlings, however, is that they solely occupy the ground under the seed-beds for one entire year, without yielding any return that season, and also that during the second summer they are sometimes liable to produce multitudinous crowns; and unless they are reduced they form but weakly subjects for next winter's forcing. By lifting them in January instead of March, cutting them back as before directed, and placing them in layers on beds, as already advised for root cuttings, all starting eyes, excepting the main single crown, could be rubbed away, and thus much labour saved. The reason why the seedlings are not thinned and planted out the first season is because if so treated the majority of the plants "bolt" during the summer, and at liftintime the roots are too weak for any payable purpose, and therefore are both troublesome and unprofitable.

**Planting and Summer Treatment of Young Plantations.**—The Seakale cuttings being prepared and in readiness for planting, that operation is usually performed in March. No ground is prepared for them alone, but they are inserted with iron-shod dibbers at certain distances amongst the crop at the time occupying the ground. As a rule, the most approved method of cropping the Seakale ground at planting time is this:—The ground, after being well manured and doubly dug or trenched in winter, is levelled in February, and lines drawn along it 2½ ft. or 3 ft. apart for Cauliflowers, which are then planted, keeping them at the same distance asunder in the rows, or more generally at that of the least distance. Between the lines of Cauliflowers, other lines are drawn precisely in the middle—but these lines are more commonly guessed at than measured—and in them are planted white or green Paris Cos Lettuces, only half the distance asunder in the rows as the Cauliflowers. In the rows occupied by the latter, too, Lettuce plants are inserted alternately with the Cauliflowers. Thus in the field there will be, when finished, three Lettuces for every single Cauliflower. The ground is now ready for receiving the Seakale, a set of which is planted with the dibble, alternately with Lettuces and Cauliflowers in all the rows. The Lettuces are first ready for market, and are commonly removed before they can injure the Cauliflowers. By the end of May most of the latter crop is also marketed—thus leaving the Seakale, which by this time will be coming up strongly, in sole possession of the soil. Mr. Broadbent, of Parson's Green, Fulham, an excellent gardener, plants his Seakale sets 15 in. by 18 in. apart amongst his spring Cabbages, which are all removed before they can materially injure the Seakale. Mr. Dancer, nurseryman and market gardener, Fulham, plants some of his sets in the alleys between his Asparagus ridges; but in this case they must all be lifted at the end of the first season. Mr. Geo. Steel plants some of his sets in rows between his Gooseberry bushes and Moss Roses; but they must always be removed for forcing at the end of the first season. Some nurserymen plant their sets at 18 in. apart each way, and never intercrop the ground amongst them, but take great care of them; and, under such management, they get finer roots than can be produced in the market gardens. These nurserymen's roots being all lifted next winter, the best are sold for forcing, and the weakest cut back and sold for planting. No further care is necessary throughout the summer and autumn than frequently hoeing the surface soil, cutting away all flower-spikes, and rubbing off all small shoots that may chance to spring around the main one. Towards the end of the year, if the plantation is to be entirely lifted for forcing, say about the last week in October or the first fortnight of November—just as soon as the leaves have decayed, they are raked off into heaps with a wooden-toothed rake, and carted to the manure-heaps. Sometimes they are left as a partial protection against frost.

**Winter, Spring, and Summer Management of Old Plantations.**—Although young Seakale plants are the most suitable and convenient for forcing, still there must be a portion, if not an entire plantation, left for producing "natural" Seakale—*i.e.*, the Kale unforced. In private gardens this is commonly done by covering the crowns with pots made for the purpose, or a framework of wood covered with a mulching of leaves to exclude light: indeed, in the same way, but with increased covering of leaves or litter, the bulk of the Seakale is forced. The object of this old-fashioned and really troublesome plan is to save the forced plants for another year's use, thus incurring a watchful attendance during the succeeding summer in cutting out the flower-stems and reducing the shoots; otherwise, if left to grow as they can, they will produce multitudinous weak crowns, that will bear as many, if not more, weakly ones next year. If a young plantation be made every year, part of it to be lifted for forcing, and part left for spring use, to be grown on next summer, and lifted for forcing in winter, less time, ground, and trouble are required than by adopting the old principle of keeping the same plantations untouched year after year. In the end of autumn or beginning of winter, all roots to be forced may also be lifted, and lined in as closely as they can be put in some cool corner out of doors, to be taken into the Mushroom-house as required; and thus the piece of ground they occupied is empty, ready for manuring, trenching, and ridging, and in good condition for early cropping in spring. In market gardens all plantations are made as recorded under the preceding heading; and if the field is to be kept to yield "natural" Seakale, every third row is lifted, and thus the rows are left in pairs, having a space of nearly, if not quite, 3 ft. between them. The surface of the soil is then raked clean, and from this wide space the rows are earthed over to the depth of half a dozen inches, any time between November and February,—but the sooner the better, so as not to interfere with the other work, and also to prevent the frost penetrating the ground amongst the crowns and thus rendering it cold and late. The Kale begins to push about the second week in March, and, according to the position of the field and nature of the soil and weather, a supply may be gleaned therefrom till the end of April. As soon as the point of a shoot is discerned above the ridge, that head is fit for cutting, which is usually done twice or three times a week. When the day's cutting is over, the Kale is placed on its ends in broad shallow baskets, washed, tied in punnets of a dozen heads, again packed into baskets, which are piled on waggons and sent to market. After the Kale is cut, the ridges are levelled down, and the space between the rows cropped with white Cos Lettuces, which heart at this season better than any other sort. Immediately the Seakale begins to grow numerous crowns are produced; but these are all reduced to two, or at most three, of the strongest, and in this respect, in removing their flower-spikes, and in keeping the soil about them loose and clean, they are well attended to afterwards. These old roots are used next winter for forcing.

**Forcing.**—Seakale is seldom forced in the ground as it grows in market gardens, for such a practice would be far from remunerative; indeed, all the Kale that could thus be forced would not pay for the trouble taken with it. In market gardens the roots are all lifted and dressed for forcing, cutting away the thongs to within an inch or two of the main root, as explained under the head of "propagation." If Seakale be required early, say in the first fortnight of November, the very best crowns, and such as are best ripened, which will be seen by the leaves being withered the earliest, should be selected, as it is a difficult matter to get it to start so early, notwithstanding its being the easiest of all vegetables to force. Having the crowns in readiness, a hotbed is prepared for starting them in, which, in the case of the earliest batch, merely consists of a manure-bed covered with frames and sashes, and a few inches deep of soil levelled within the frames for planting the roots amongst, and that is done as thickly as they can be conveniently stowed together. It is endeavoured to keep up a heat of 65° or 70°, as they require a little extra excitement to influence them thus early. Litter or mats are kept on the surface over the glass, so as to keep all dark and blanch the Kale. Mr. Humphreys and Mr. Steel endeavour always to have a good cutting of Seakale in time for Lord Mayor's Day in London; but, as a rule, this is considered too early for regular forcing. When the time comes—about the first fortnight in November—the beds where Cucumbers were grown during the previous summer are cleared out, and re-filled with hot manure, over which about 8 in. of soil are placed and levelled, but no frames are used for the Seakale. A notch is then made crosswise in the beds, and therein the crowns are planted as thickly as possible, earthing them up to the top, which is left bare, and proceeding in this way till the whole bed is finished. The lines across the bed are about 5 in. apart, and about the same space of a margin is left empty on each side. Amongst the roots, and lengthwise in the beds, four rows of short stakes are inserted, so that they may be 18 in. above the soil. Some 6 in. or 7 in. of short litter are then strewed over the whole surface of the beds, which are afterwards covered with mats supported on the ends of the stakes.

When these stakes are not used hoops and mats are employed for the purpose. In about three or four weeks after the beds are made up, cutting generally begins, when it is necessary to uncover the beds as the operation proceeds, drawing the short litter off the crowns to get at them, and replacing it as speedily as possible, as all the crowns are not fit to cut at the same time. For cutting the forced Seakale a small tool with a handle about 1½ ft. long, bent at the neck, and with a blade about 2 in. wide by 3 in. long, like that of a spade or Dutch hoe, is used. This is a handy instrument, and well adapted for its purpose, as it may be so deftly employed for cutting over the Kale with a small piece of the root-stock adhering to it. The mode just described of forcing this vegetable is only that practised as regards the earliest beds; and, indeed, many growers do not adopt it at all, whereas all market gardeners who make Seakale forcing a part of their business form their beds, particularly the late ones, as follows:—A well-sheltered plot, near home and the manure-heap, is selected and lined off into spaces either 4 ft. or 5 ft. wide, with intervals 2 ft. wide between them. These spaces are used as beds, over which the soil from the alleys or intervals is placed, after finely breaking it, until the alley is 20 in. deep. The Seakale crowns are then all lined into these beds as described in the case of earlier beds, and thus the beds are left uncovered until they are required for forcing; but, as a rule, two or more of them are always being forced, and others started to succeed them. As these beds have no bottom-heat, it is not necessary that they should be immediately covered, as in that case they, being incited at the bottom, would grow, no matter whether their crowns are cared for or not; but, in this instance, having no exciting agent, and being in a dormant state, they await the cultivator's convenience. In forcing them, the alleys between the beds are firmly filled with fermenting manure, and, the beds being covered as formerly directed with short litter and mats supported on the upright stakes, all is finished. The Kale takes a longer time to push into growth by this means than when forced on a manure-bed, and it does not come quite so regularly. This method, however, has the advantage of less trouble and risk, and great convenience in keeping up a supply until it can be produced from the open-air beds, at which time all forcing should desist, and the forced roots should be forked out and removed to a heap by themselves, or to the piggery, where their vitality is sure to be destroyed—otherwise, if mixed amongst the manure, conveyed to a field at once, and dug into it, they would certainly grow again, and prove a future annoyance. The manure being forked out from between the alleys, the soil is levelled, and the piece of ground will then be ready for digging over for French Beans, Cauliflowers, Tomatoes, or for erecting Cucumber frames on. Mr. Gilbert, of Burghley, has a good method of heating Asparagus beds, which appears very feasible as regards Seakale beds. This plan is to get 2-in. drain-tiles, which he inserts at short intervals into the sides of the beds, so as to admit the heat from the fermenting material in the alleys to the interior, and thus increase the temperature.

A correspondent writing to the *Garden* recommends seaweed and sea-sand in the culture of Seakale. He says: "Permit me to suggest that those residing near the sea-shore, who cultivate Seakale, should make use of both sea-sand and seaweed if they desire to obtain really fine, yet delicately-flavoured crops. The name Crambe maritima points to the natural habitat of the plant, which is found in a wild state on different parts of the coast, growing upon shingle and sand. It was this which gave me the idea, now many years ago, of making use of seaweed mixed with manure in the formation of Seakale beds, and of covering up with sea-sand such plants as I did not want to force, but cut from naturally. My Seakale, thus treated, was excellent—the Kale growing up through the sand being white, crisp, and free from any rank taste or smell. I planted a row of crowns in a bed formed of manure, seaweed, and mould; and then in autumn, instead of covering with pots, I had a ridge of fresh sea-sand, nearly 2 ft. in height, raised over the entire row. The Kale, thus treated, came in just as the forced row of plants was going out; directly the shoots began to peep through the top of the ridge, we removed the sand, and cut from the crown shoots very superior, in point of taste, to those of the manure-forced vegetable.

## Scorzonera

(*Scorzonera hispanica*).

THIS is probably a native of Spain; it is grown for the root, as in the case of Salsafy, but the root has a different appearance, inasmuch as it grows longer and more slender than Salsafy. It is also more apt to run to seed. They are both cooked in the same manner, and the same mode of culture recommended for Salsafy will answer perfectly for Scorzonera.

## Spinach

(*Spinacia oleracea*).

SPINACH was unknown to the ancient Greeks and Romans, but appears to have been early used by the Arabs, and transferred to their gardens from the plains and lower hills of Western Asia, where it is now found wild. The Moors carried it with them into Spain, whence it gradually spread, in the Middle Ages, over the rest of Europe. It has now generally replaced the Orache (Atriplex hortensis), a plant also of Eastern origin, but of much earlier introduction, as it appears to have been known to the ancient Greeks under the name of Atraphaxis, and to the Romans under that of Atriplex.

**Varieties.**—There are several varieties of Spinach, and there are also many kinds of Beet, etc., used as substitutes for Spinach. Those kinds generally cultivated, however, are the Round Spinach, Flanders Spinach, and Lettuce-leaved Spinach (these are smooth-seeded kinds): of the prickly-seeded kinds we know only one distinct variety, commonly called Winter or Prickly Spinach. Then there is the New Zealand Spinach (Tetragonia expansa), a variety introduced from New Zealand; and although somewhat inferior in quality to other kinds, it forms a very valuable dish in dry seasons.

**Sowing, etc.**—The first sowing for summer use should be made early in March, as a rule; but in warm soils and situations a small sowing may be made in February. Owing to the Summer Spinach being so liable to run to seed, it is advisable to make small sowings often rather than to make large sowings at long intervals,—as by the former plan a regular supply of fine young leaves is insured, whereas in the latter case small tough leaves have often to be used *in consequence* of successional crops not being sufficiently advanced *to give a supply*. It is therefore obvious that a sowing should be made once a fortnight, or at longest every three weeks, during the summer months. These sowings may consist of the Round Spinach for the first two or three sowings, and the Flanders or Lettuce-leaved varieties for sowing through the summer. These two last-named kinds are far superior, in both quality and cropping, to the Round Spinach.

For summer sowings it is best to choose as shady and moist a situation as possible, to save watering, as well as prevent the plants from running to seed so quickly. All Spinach seed is benefited by being soaked in water for a few hours previous to sowing, inasmuch as it germinates more quickly and the growth is often stronger. Sowing in drills is by far the best mode of sowing the seed, inasmuch as the crop is more easily kept free from weeds, and watering or mulching can be effectually done when desired, as well as it being much easier to gather the crop. The drills should be from 9 in. to 1 ft. apart, and the plants, after thinning, at least 6 in. asunder. The Lettuce-leaved and Flanders require even more room than this, if the production of fine large leaves be aimed at.

The last summer crop should be sown on a well-prepared border or quarter about the middle of July, in drills about 18 in. apart; this will yield a good supply of fine large leaves till October is out. For the late or winter crop prepare about the end of the month a border or sheltered quarter; apply a good coating of thoroughly decayed manure, trench the ground well and cast it up into ridges, so as to expose as great a surface as possible to the influence of the atmosphere. Every dry day till August 10th or 12th cast down the ridges and pulverise with a steel fork, so as to sweeten and incorporate all together. Then draw lines 1 ft. apart and sow the hardy Prickly variety. As the plants advance, thin them out from 6 in. to 9 in. apart, and maintain a healthy and vigorous growth by constant surface stirrings in suitable weather: this, if attended to, prevents canker, and encourages the production of abundance of fine leaves for use every day throughout the winter. Timely forethought should be taken to shelter a portion with a row of short stakes about 18 in. high, interwoven with fern, straw, evergreen branches, furze, heath, or other material, which should be neatly applied, and also made wind-proof. Thatched hurdles or frames, cheaply made, of battens backed together and thatched, might also be used for the purpose of protecting from frost. The last sowing, to supply leaves in the spring, generally consists of the Prickly variety.

The time to sow this crop, however, depends upon the locality. If sown too soon, it runs to seed the same season and is useless. To sow it late enough to have a crop of leaves without the plants throwing up their flowering stems is what has to be aimed at, and for this reason many sow twice for the winter crops. In some parts of Scotland and the north of England the middle of August is not too soon, while in the south it is not often safe to sow before the end of September; but a practical acquaintance with the climate and locality will generally be the best guide. This crop is often sown after Potatoes or Onions. The winter crop will generally afford a good supply of leaves till nearly the beginning of June, by which time the round or summer Spinach will be coming in in abundance.

**Soil, Watering, etc.**—A deep, rich, moist soil is necessary to grow good Spinach; and if liberal supplies of liquid manure be given to summer crops, a great advantage will be gained thereby. Some care is required in picking Spinach, especially in winter, when the growth is often not equal to the demand. Indiscriminate picking will soon ruin the crop; the largest leaves should therefore be taken first, and picked off singly, so as to avoid otherwise injuring the plants. In addition to the above directions, it is at all times beneficial to keep the ground stirred between the rows of the summer and winter varieties, and to destroy the weeds as soon as they make their appearance.

**New Zealand Spinach.**—Until the introduction of the New Zealand Spinach, gardeners often found it a difficult matter to provide a continual supply during the dry summer months with the common round Spinach, which is ever intent on running to seed. With the aid of the New Zealand variety, however—which, properly speaking, is not a Spinach, though a most excellent substitute—they can keep up a good supply even in the hottest and driest seasons, which, in fact, are the most favourable to its development. The common Summer or Round Spinach is an excellent variety; but, being an annual, when sown after the beginning of April it goes to seed almost immediately under the highest cultivation, and affords but few gatherings, the leaves soon getting small and tough; hence the value of the New Zealand Spinach, which comes in shortly after midsummer, and a few plants afford an abundant supply of fine succulent leaves till the beginning of December, if frost be not very severe, when the Prickly or Winter Spinach will be ready for use. An ounce or two of good seed is sufficient for the largest establishment. The seeds are very hard, and it will hasten germination if they be steeped in water for twenty-four hours before sowing. Twelve 6-in. pots, with about six or eight good seeds in each, will be enough. They should be sown in light rich soil, and covered not more than half an inch deep. The pots may be set near the light, in any odd corner of a hothouse where the temperature ranges from 65° to 70°. If the seed be good and not old, it will vegetate in a week or little more, and, as soon as the seedlings have made their second leaves, they should be thinned out to six plants or less in a pot, and they may be moved into a lower temperature (say a greenhouse or cold pit) to harden off gradually before being planted out. This is generally done some time between the beginning and end of May, according to the locality. A border with a south or west aspect is the best situation for this Spinach, and is even necessary in cold districts. The border should be dug deeply, and about one or two barrow-loads of decayed hotbed manure, or rough leaf-mould mixed with soil, should be laid down in a hillock for each plant in the centre of the border, and about 6 ft. from each other. One pot should be planted in the centre of each heap, taking care not to disturb the ball.

**Golden Summer Spinach.**—A correspondent to the *Garden*, writing on this variety, says: "I gave a pinch of seed of my Golden Summer Spinach to a friend who has a long walk through a paddock connecting two of his gardens, and requires this walk to be made gay at the lowest possible cost. He invited me to see it, and I was surprised at the effect my Golden Spinach made. There are two long ribbon borders of a coarse character, and they were planted with rows of Dell's Crimson Beet, Golden Spinach, Purple Orache, tufts of Maize, tufts of Amaranthus tricolor, and a back row of Phytolaccas. The whole of the plants used were eatable, and as my friend consumes ten to twenty bushels of Spinach per week, the pinching back of the plants to keep the lines perfect is a business that pays well. If any question arise in the mind of the reader as to the uses of the plants, it may be answered by the simple statement that, with the exception of the Maize, every one of these plants may be used as Spinach advantageously; and as for the Maize, the young cobs are cooked in the same way as Asparagus. People cry out for Spinach to make a change from Peas and Beans during the summer months; but they could have any amount if they would cook the young tops of Chenopodiums, Amaranthuses, and Phytolaccas. My Golden Spinach, which makes a grand bedder of the same tone of colour as Golden Feather Pyrethrum, is but a variety of the Green Orache. It is the most delicious Summer Spinach I ever tasted."

Another famous substitute for Spinach in summer is the foliage of the Silesian White Beet, a row or two of which will produce a quantity of fine clean healthy leaves in the heat of summer. In autumn the silvery clean white stalks of this famous Beet make a very good substitute for Seakale; they are served at table in the same way, and make a capital wholesome dish.

**Preserving from Frost.**—The following American ways of preserving Spinach against very severe frost may not be without interest to our readers:—The first and least expensive practice is to cover the bed at once with a coating of an inch in thickness of salt, hay, or straw. This will protect the leaves from frost; and by removing the mulch the Spinach will be found in good condition. The second method is, to cut off the Spinach before the ground becomes frozen—leaving, if possible, a little earth attached to the roots. The leaves of this cut Spinach are then placed in a cold frame in a layer eight or ten thick, with some leaves from the woods spread on top. The sashes are kept on the frame, and the Spinach will keep green until wanted.

**Culture in Market Gardens.**—Spinach is not cultivated for market purposes in summer, owing to its liability to "run" almost as soon as the seed has germinated. The round-leaved sort is that which is used for spring sowings, the first of which is made in February, a second about the 1st of March, and another sowing or two at an interval of three weeks or thereabouts, just as empty space and convenience permit. Spaces under trees are often covered with Spinach sown broadcast; and, as the trees are not furnished with leaves, they do not shade the plants. Open fields are also often sown with Spinach in beds, which are covered by throwing soil over them from the alleys; on these beds Cauliflowers are also planted, at the usual distances apart. By the time the Spinach has come well up the Cauliflowers will have become nicely established, so that the Spinach, which as soon as ready is removed for market, does not injure the Cauliflowers much. When the Spinach is removed, the Cauliflowers are permitted to have all the space; consequently the ground is gone over, hoed, and allowed to rest for a few days, when some soil is drawn to the Cauliflower plants. The latest spring sowings of Spinach are made on a damp cool piece of ground, provided such can be obtained, as, thus circumstanced, better leaves are produced in hot weather than on dry and warm soils. In July, if the weather be moist, a sowing of the round-leaved variety is usually made on a spare piece of ground, for autumn use. The first autumn sowing is, however, generally delayed till August, early in which month a large sowing of the Prickly-seeded or Flanders is made broadcast on fields or in rows about 8 in. apart. Mr. Myatt prefers the Flanders, and, indeed, most growers also do so, on account of its large fleshy leaves and hardy constitution, and it sells more readily than the prickly sort. By sowing on the 12th and 25th of August and the 14th of September, Mr. Myatt keeps up a succession of Spinach from October till May. Although during winter but few leaves are produced, the earliest sowings yield freely before then, and the two latter abundantly in spring. Coleworts are frequently planted in a field of late Spinach, at 3 ft. or 4 ft. apart. In damp winters a large proportion of the roots may die, but in ordinary winters they retain their vitality, and produce abundance of large fleshy leaves in spring. No care is taken with this crop from the time of sowing till gathering, beyond hoeing and thinning once or twice. Spinach for market is packed firmly in round baskets, and also in hampers of any size convenient for handling.

## Shallot

(*Allium ascolonicum*).

Natives of the warmer side of the Mediterranean region, Shallots naturally do best in a warm position and in a light, fertile soil. The Shallot is one of our best and most wholesome vegetables, useful alike for soups, salads, and other purposes; and it makes one of our best pickles. It is, in short, in every-day use, both in the kitchen and in the pantry. There are several varieties now in cultivation, and of these the light-coloured one is the kind mostly sought after for culinary purposes, but it is not so heavy a cropper as the dark-coloured Russian variety, and it is also more subject to canker and mildew. The dark hardy Russian kind is a heavy cropper. There is another kind much resembling a medium-sized Onion in form and appearance, which is also of a much milder flavour than other kinds. In order to grow Shallots well, and free from disease, fresh manure should never be applied to the ground on which they are to be grown. In autumn, or early in winter, trench up and ridge a piece of ground for them that has been manured the previous season for some other crop, and fork it over in frosty weather, in order to get it sweet and well pulverised. Level it down, and plant the bulbs in February, but never by any means bury them too deeply, nor plant them in very loose soil, for they are very subject to canker and mildew just when in full growth in May, if damp gets down between their partings or cloves; and on account of these attacks they are almost always scarce and dear. After levelling the ground, stretch a line at distances 1 ft. apart; with one foot tread the ground along the line, only at planting time, from end to end; then just press the bulbs on the surface, and place a pinch of fine cinder-ashes on them, to keep worms from them. In March, when the surface becomes dry and mellow, tread between the rows with both feet, so as to make the ground as firm as possible. This will raise the rows of bulbs a little above the general level; then just clear the loose earth away from the bulbs, which will now have pushed forth roots, with a hand or small hoe, so as to allow them (*i.e.* the bulbs) to stand quite clear of the ground. Thus situated, disease, or mildew, or failure, is scarcely possible; on the contrary, good, healthy, sound, firm crops are obtained. Plantations of Shallots may be made in October or March, but late in February or very early in March is the best season; and the crop may be taken up and stored whenever the leaves die down, or, if not then, in autumn. After being well dried, the roots should be hung in nets or laid thinly on shelves, or even hanked in an airy loft, or wherever the Onion crop is stored. Shallots may also be raised from seed sown in March, in the same manner as Onions; and if thinned to 9 in. or 12 in. apart, and kept watered in dry weather, will generally yield larger bulbs than those planted in the usual way.

## Skirret

(*Sium Sisarum*).

THIS is a native of Japan, seldom grown in English gardens. It is similar to Salsafy and Scorzonera, and is used in the same manner. The flavour is, however, far inferior to either of these sorts, and the roots of the Skirret are produced in thongs from the crown, and are therefore not so useful as the clean straight roots of the Salsafy and Scorzonera. It succeeds best in a deep sandy soil, sown in April in drills 1 ft. apart, thinning the plants out to 6 in. or 8 in. apart when large enough. Skirret may also be propagated by eyes taken from old plants previous to their shooting in the spring; but being both a troublesome and useless operation it is not worth further comment.

## Sorrel

(*Rumex Acetosa*).

THIS is so much used in cookery that it is in no danger of falling into the abyss of things forgotten, like many of our old garden herbs. Being all hardy perennials, the simplest need no instruction as to the culture of Sorrels; but the kinds differ a little. There are three species cultivated—the common Sorrel (Rumex acetosa), a native of Europe and Asia, from the Mediterranean region to the Arctic circle, and also of the southern hemisphere; the French Sorrel (R. scutatus), a native of Continental mountains; and the mountain Sorrel (R. montanus), from the same region. The varieties of the first-mentioned kind are those mostly grown in our gardens—that known as the Belleville Sorrel being most esteemed. Near Paris, where large supplies of Sorrel are grown for market use, the Oseille Large de Belleville is the kind most generally grown. The round or French Sorrel is a trailing perennial of a rather glaucous hue, growing anywhere, not appearing so welcome to slugs, nor running to seed so fast as the other kinds, and producing a large quantity of leaves. We have always thought these more agreeable in flavour than the leaves of any other variety of Sorrel cultivated. Of Rumex montanus there are two good varieties—the Oseille Vierge, and the variety with blistered leaves, O. Vierge à feuille cloquée. Sorrel is chiefly sown in spring, either in drills or broadcast; the latter mode is to be preferred in market gardens, as it will grow almost as thickly as in drills, and Radishes or Spinach may be sown among it, and Cos or Cabbage Lettuce may be interplanted. However, if an earlier crop be desired, it should be sown alone. It may also be sown under frames among Cos and Cabbage Lettuces. These sowings may be made up to July, but the spring is the best time. The large-leaved kind, called de Belleville, comes in in May, and of it two or three gatherings may be made. It requires a great deal of water. In autumn, a good mulching of spent manure is given, and, after two or three gatherings in spring the bed is run out. Manure and mulching are the two essential points in growing this plant.

The Oseille Vierge, or Virgin Sorrel, is planted in borders in spring. It lasts for a very long time, and never runs to seed—whence its name. It is only grown in kitchen gardens. Sorrel is grown in hotbeds in the following manner. It is sown on sloping beds in spring. These beds are 4½ ft. wide, and alleys 16 in. wide are left between them. Other vegetables are grown in these alleys, which should be cleared out by November or December. At this time 1 ft. or 16 in. deep of soil is removed; and a good layer of spent manure put in; then the frames are placed on the beds and covered with their lights; finally the alleys are filled with good *mixed manure,* which should be stirred up from time to time. *Instead of thus* forcing the Sorrel as it grows, it may be planted out under glass on hotbeds covered with 6 in. or 8 in. of soil. After two or three gatherings, the beds may be broken up. These beds require the same treatment as other beds. To obtain seed, a number of plants are allowed to run in spring. The seed is gathered in July. It keeps good for two years.

## Tomato or Love Apple

(*Lycopersicum esculentum*).

This is a native of South America, and was cultivated in many parts of Europe as far back as the sixteenth century. Tomatoes have risen so much in public favour during these few years that there is now a great demand for them at all seasons, whereas formerly they were seldom sought after, except when they could be got plentifully out of doors. In some parts of the country good outdoor crops of them may be reckoned on with tolerable certainty; but still it is advisable to have some in pits or frames, or in houses where protection can be afforded them. Tomatoes are grown largely both in America and on the Continent. From France and Spain come large consignments of them in a fresh state, and from America they come in cans, the contents of which are almost as good as freshly-cut fruit. They are also largely cultivated in market gardens round London. They are likewise often grown for ornamental purposes, and healthy plants of some varieties, laden with ripe fruit, associated with other plants, have a pretty effect.

**Outdoor Culture.**—Plants for outdoor culture require to be in readiness for planting out by the first week in June—*i.e.*, if ripe fruit be expected from them in the open air; if delayed longer, the chances of success are greatly diminished. If the weather be favourable during the latter end of May, a plantation might be made, at the same time reserving sufficient to take their places should they get injured by frost. It is a too common practice to sow seeds of Tomatoes in heat in January and February, in order to obtain plants for outdoor cultivation, and to allow them to become starved and root-bound in their pots for a long time previous to being planted out. This is sometimes done with the view of checking their growth, and thereby inducing them to fruit earlier and more abundantly than they otherwise would do; but it has been proved to be a mistake, for although plants confined at the roots may show flower earlier than those otherwise treated, yet plants that are grown on freely will not only produce the earliest fruit and most abundantly, but the finest and best flavoured. The exact time at which to sow the seed will of course depend upon the convenience at command for protecting the plants after they are up. If at starting a temperature of 55° or 60° can be given them, the beginning of April will be early enough; but if that amount of warmth cannot be given, and they are obliged to be raised in cold pits, it will be useless to sow before May. Pans are generally used for seed sowing, but if a gentle hotbed can be spared, it will be better to sow on that, provided the plants are taken up before transplantation would damage the roots. Perhaps the best method of all is to put two or three seeds in 3-in. pots, and place them near the glass, thinning them out after they are up, so as to leave the best and strongest plant in the pot. After that they should be kept moist, and potted on as they require a shift until the beginning of May, when they may be gradually hardened off by putting them into cold frames, and keeping them close for a few days, giving them air more freely as they advance in growth. After they have attained the height of 9 in. or 12 in., the shoots may be stopped, to strengthen the plants and make them more bushy. The growth made after this will be more hardy and shorter-jointed than when the plants were in heat, and they will be more likely to succeed when planted out than if they had not been stopped.

**Planting, etc.**—A warm situation is indispensable for Tomatoes; therefore, if there be one spot in the garden warmer and more exposed to direct sunshine than another, let them have the benefit of it. Vacant spaces between fruit trees on a south or south-east wall are generally the places allotted to them, and where this can be done it is an excellent plan; but the best place for them is a sunny bank, pegging them down close to the ground as growth advances. If a bank be made for the purpose, it should be thrown up high enough at the back to give it rather a steep slope; any kind of rough soil will do for making the bank itself, provided a space be left at its base for suitable soil for the plants to grow in. Ridges similar to those employed for Cucumbers are likewise sometimes used, and with satisfactory results. Another way, and a very good one, is to have rough pieces of trellis-work or hurdles placed in a slanting direction and firmly secured at the front, the back being supported on stout stakes. Plant them at the base, as in the case of banks, and allow the Tomatoes to run over the trellis thinly but regularly; and when a good show of bloom has been produced, pinch off the points of the shoots one joint above the flowers. The fruit will then set quicker and more evenly than it would if allowed to make overgrowth. When sufficient fruit has been set for a good crop all flowers should be removed and the shoots should be kept closely pinched in. Thus treated the fruit will swell rapidly—that is, if the weather be favourable. After planting, a good mulching of rotten manure may be advantageously applied if the weather be dry.

**Culture under Glass.**—Growing Tomatoes under glass is doubtless a very profitable mode of culture where there is convenience for efficiently carrying it out. Pits, frames, shelves in Vineries, Peach-houses, Pine-stoves, etc., are all places in which Tomatoes may be grown with success; but where a span-roofed Melon or Cucumber-house is at liberty, these structures are undoubtedly best adapted for the purpose. Very heavy crops are sometimes produced by plants grown under such circumstances, planted in beds, and trained up the trellis like Cucumbers. Where due attention is paid to stopping and trimming, as recommended for outdoor Tomatoes, and where liberal supplies of manure-water are given when needed, and the foliage kept clean and healthy, single plants have been known to produce as much as a stone of fruit. There are, however, few places where a house can be wholly devoted to the growth of Tomatoes; nevertheless, they may be grown on shelves in Pine-stoves and elsewhere, with considerable success. In fact, the fine Tomatoes shown some few years ago at South Kensington by Mr. Pragnell were grown in pots placed on the back shelves of lean-to Pine-stoves, and trained down the roof over the pathways. When grown in this manner abundance of manure-water must be given them, especially after the fruit is set; and in this way good fruit may be produced as early as April. Where pits and frames are used for their culture, planting out is the best system, and they should be treated in the same way as Melons; but if a trellis on which to train the plants be suspended about 6 in. or 8 in. from the glass, the fruits will ripen better than they otherwise would do, inasmuch as they will be more exposed to direct sunlight. If pots be used stakes must be applied, and the plants must be kept within due bounds by means of close stopping. Plants to produce very early Tomatoes are best obtained from cuttings struck in December or January, as they possess the property of coming into bearing sooner than those raised from seeds. Large branches, 1 ft. or more in length, if not too hard, will strike root readily in a warm, moist heat, and in four or five weeks will have set their fruit, which, if properly treated and there happens to have been a little sunshine, will be ripe in seven or eight weeks afterwards. Good Tomatoes may be obtained in June and July by growing plants in pots, in Vineries etc., until such places get too shady for them, by which time their fruit will be set, and they may be plunged out of doors under a south wall, protecting them at night if the weather be cold. If a late Peach-house or orchard-house be at hand, of course such places are preferable to putting them out of doors.

**Soil, Watering, etc.**—When the crop has been gathered from plants grown in this way, and they are still green and healthy, they may be slightly cut back, potted into large pots, and plunged out of doors in some sunny spot. If they be then well supplied with water they will yield another very good crop late in the autumn, which will be very useful where a constant supply is desired. If the fruit be not ripe when the cold weather sets in they are easily moved into a warm house or pit. Soil of a very rich character is not necessary for Tomatoes, nor is it beneficial, inasmuch as it causes too luxuriant a growth, which is detrimental to the production of fruit. A deep and moderately rich garden mould is best for outdoor cultivation; but for pots or beds under glass, turfy loam, roughly chopped up, with one-fourth rotten manure or leaf-mould, and a few shovels full of road or river sand added, is most suitable. Wherever Tomatoes may be planted, the soil in which they are to grow should be made moderately firm, as hard soil will hold moisture for a longer period than that which is light and open. Good drainage is also necessary, especially in pot-culture, or the soil becomes sour and the plants soon assume a sickly appearance. During dry weather abundance of water is necessary, and after fruit is set strong manure-water should be given. During favourable weather frequent sprinklings overhead in the evening are also beneficial, inasmuch as they keep the foliage clean and healthy.

**Varieties and Gathering.**—As regards size and appearance, Tomatoes have doubtless been improved, but the new varieties are much more tender than the older ones; therefore, for outdoor culture, the latter are to be preferred. The Large Red and Early Smooth Red are the two best varieties for outdoor culture, and are largely grown round London and Paris for market purposes. The Orangefield is a good dwarf, hardy, and prolific variety, and should also be largely grown for outdoor crops. For early crops under glass, or for general crops, where protection is afforded, Hathaway's Excelsior is perhaps the best variety that can be grown; it is large, round, perfectly smooth, and excellent in flavour, and is valuable for exhibition purposes. It is a kind highly appreciated by American growers, who consider it the best variety in cultivation. Mr. Gilbert, of Burghley, exhibited at South Kensington recently fine specimens of a variety named Jackson's—a very large kind, and excellent in quality, evidently a selection from Hathaway's. Of the way in which these were grown, Mr. Gilbert gives us the following account:—The seeds were sown on January 26th in heat, and the young plants were pricked off into small pots, two in each, the last week in February. At that time a house containing young Trebbiano Vines was started; the Vines were planted in a bed in the middle of the house, and there was about 3 ft. of space along the front. Here, after making a rough raft to support the soil, the Tomatoes were planted, and they grew away very slowly, but sturdily. The temperature varied from 45° to 50° until the Vines were fairly "broken," when it was raised from 62° to 68° in the daytime. Tomatoes are reported to keep away insects, and this they did, in this instance, effectually. The soil in which they were planted was pure loam, of a light, friable character, mixed with horse-droppings, at the rate of one barrowful of the latter to six barrowfuls of the former. In this they bore well and continuously for many weeks. At one end of the house were a few plants of Carter's Green Gage Tomato—a remarkably good kind. It may be added that a slight quantity of soot mixed with the water when the fruit is swelling has a good effect on Tomatoes. Trophy is a good early Tomato, and Green Gage is highly spoken of by some, but it does not ripen early enough for outdoor culture; indoors, however, it is a useful variety. Maupy's Supreme is a handsome variety, but not so prolific as many others. Earley's Defiance is likewise a good early sort, and a good cropper, but in shape inferior to Hathaway's Excelsior and Maupy's Supreme. As fast as the fruits ripen they should be removed in order to benefit those that are left on the plants; if any remain unripe until late in the season, they should be cut off with a large piece of the plant attached to them, and hung up in a house near the glass, where they will soon ripen if the weather be sunny. It is unwise to overcrop plants of

Tomatoes; therefore, where they set their fruit too thickly, the smallest should be picked off and used for pickling.

**Insects, Diseases, etc.**—Red spider, green fly, and small-winged white fly, are the principal enemies by which Tomatoes are attacked; and these may easily be kept in subjection by means of frequent syringings with Tobacco water. Of late years the Potato disease has attacked Tomato crops just as they are ripening, rendering them useless.

**Tomatoes in Market Gardens.**—The large red-fruited sort is the only kind cultivated in London market gardens; and growers for market will not be easily persuaded to exchange it for any of the so-called novelties that have lately appeared among Tomatoes. Market gardeners only grow what they are pretty sure will prove remunerative. Early in spring the seeds of the large red kind are sown broadcast in a frame, set on 18 in. in depth of fermenting manure, over which 6 in. in depth of light soil has been placed. In severe weather the frames are protected at night by means of a covering of litter placed over the sashes, but this is removed in the morning, when a little air is given. It is advisable to have the young plants as strong, healthy, and stubby as possible; and in order to secure this, a gentle bottom-heat and plenty of ventilation are necessary. Soon after germination they are thinned a little, and when they are about 1½ in. or 2 in. high, they are pricked out into 4-in. or 6-in. pots, two plants being generally put into each pot. Frames are sometimes prepared for these as follows:—First, 1 ft. in depth of fermenting manure is put together in the form of a bed, on which is placed 8 in. in depth of soil, and in such beds pots filled with mould are plunged up to the brim. The plants are then dibbled into the pots, and the frames shut up and kept close for a time, until fresh root-action has taken place. They are afterwards kept freely ventilated until May, when the sashes are entirely removed during the day, and only replaced and lifted up at night or in wet weather. By planting time, which is the last week in May and first fortnight in June, the plants are thoroughly hardened off, although still unable to endure even a slight frost. In market gardens Tomatoes are seldom planted against walls, as is done in private establishments; a warm situation, convenient to water, is, however, selected for them, and in such positions they produce abundance of fine, large, well-coloured fruit. The earliest planted ones are generally put in the most favourable positions, such as a warm border, or on either side of "spent" Mushroom ridges, where they are well sheltered. If planted too early, they are liable to be cut down by late spring frosts, in which case entire removal and replanting is the safest remedy; but if the damage be not too great, the sound eyes will produce shoots that will carry heavy crops. The second or main planting is made on a more open, yet warm, quarter, in rows about 3 ft. apart, and the plants are set the same distance asunder in the rows; indeed, 3 ft. is a universally recognised distance at which Tomato plants should *stand apart*. In some cases a trench is thrown out 18 in. deep and

3 ft. wide, and 1 ft. in depth of fermenting litter is packed into it and covered with soil. On these trenches, which are 3 ft. asunder, are planted two rows of Tomatoes only 18 in. apart, but the plants in them stand at the usual distance apart, and alternate one with the other in the different rows. After planting, if frost be apprehended, an inverted pot is placed over each plant at night until all danger is over. A mulching of decayed manure is generally put over their roots, and as they advance in growth little earth basins are drawn up to them with the hoe for the retention of water, which is given to them liberally. Stakes 4 ft. long are inserted beside the plants, and to these they are tied with matting as growth advances, taking care to keep the shoots on the sunny side of the stakes. To such as were planted against Mushroom ridges, stakes are, of course, unnecessary, as the shoots are pegged to the ridges, on which they thrive well. One of the most important points in Tomato growing is timely stopping of the laterals ; indeed, on this alone the amount of produce greatly depends. Some growers retain only one rod to each plant, others two, and a few three,—but none exceed that number. Every other lateral is pinched or rubbed off as soon as it appears, and when three good clusters of fruit on each plant have set, the point of the shoot or shoots is nipped out, so as to induce increased bulk in the fruit. If the amount of foliage be too great it is reduced by removing some leaves wholly, and by cutting off the half of a few more ; but sufficient must be retained to enable the plants to perform their proper functions, and to shade the fruits whilst they are swelling. As soon as the fruit has attained its full size the leaves may be turned aside so as to expose it to the sun, by which means it ripens more readily, and is of a better colour than when shaded. The ripe fruits are generally picked off twice a week, leaving the greener ones a little longer so as to mature themselves ; but should frost come, all fruits are picked off, and spread out on hay in a frame under sashes, where they eventually become red. The amount of fruit borne by a patch of Tomatoes in a well-managed market garden is really wonderful. Market gardeners pay unremitting attention to pinching off laterals and leaves, timely stopping of the leading shoots, judicious cropping in the way of bulk and quantity of fruit, and to affording plenty of nourishment by means of frequent supplies of pure water and occasional applications of manure-water when convenient, to which are added mulchings, and hoeing the ground frequently.

## The Turnip

(*Brassica Rapa*).

This is a native of Britain, being found in a wild state on the cliffs and rocks on the sea-shore, and is one of the oldest inmates of our kitchen gardens. Its degree of usefulness is excelled by few, either for the variety of culinary and other purposes for which it is adapted, or from the fact that with ordinary care it may be had in good condition nearly the whole year round. Although the cultivated Turnip is descended from a hardy native plant, it is subject to so many insect pests and diseases, that some especial care is necessary to ensure a constant and regular supply of roots fit for table.

**Sowing, Thinning, etc.**—Turnips are now almost invariably sown in drills at various distances, according to the season, as they are much more expeditiously thinned, hoed, etc., than broadcast-sown crops, and few crops are more benefited by frequent surface stirrings than these. The earliest crops, to be drawn in a half-grown state, need not be more than 15 in. between the rows, and left moderately thick in the row, and only a small quantity need be sown at a time in the largest gardens, as, if sown before April, the crop quickly goes to seed. Late or main crops, if intended to stand the winter, should have plenty of space—at least 2 ft. between the rows, and well thinned in the row—for if the leaves be crowded the whole plant will be more liable to suffer from frost than when a free circulation of air is allowed amongst them. The date of sowing will of course depend on the demand; but, as young Turnips can scarcely be got too soon in the year to prevent a blank in the regularity of supply, the first sowing should be made in temporary pits or frames in January and February, as there is not much chance of success even on well-sheltered borders before March, after which a sowing once a month will generally suffice. Those sown in May and June should in most localities be located in as cool, moderately shaded a position as possible, as a period of drought is frequently destructive to midsummer crops in fully exposed situations. The main crops, intended for autumn and winter use, which are the largest and most important, should be made from the beginning of July until the middle of August, according to locality; and a small sowing may be made at the end of August for spring use, as the smallest roots stand the winter best, and come in very serviceably before spring-sown crops are ready in any quantity. If the weather be moist and showery at the date of sowing, the seed quickly vegetates, and attention should immediately be paid to keep the young plant growing quickly by means of watering, surface-stirring, and dusting with lime, soot, or wood-ashes, to keep off insect attacks; for if growth be arrested, the roots are invariably hard and stringy. When watering is necessary, only rain or pond water should be used, of equal or higher temperature than the atmosphere, as cold spring water rather checks than encourages growth. As regards storing the crop, this need only be practised as a provision against prolonged periods of severe weather; for, however carefully they may be stored away, some deterioration of flavour takes place. A good plan is to lay the finest roots in rows, well covering them with soil, and leaving the whole of the foliage on, which forms a considerable amount of protection, and is easily supplemented in case of severe frost. Of course, they should be in a position easily accessible. Before growth commences in spring the remnant of the crop should pulled up, and stored in the coolest available position. The very latest sown crops of half-grown roots will prolong the supply until the earliest spring-sown crops are fit for use.

**Soils, etc.**—The soil most suitable for Turnip culture is a rich friable sandy loam, on which medium-sized roots of excellent quality may be produced without the aid of much manure; and the fresher the soil the better flavour the crop,—for which reason preference is always given to those grown on arable land after corn crops, as the kitchen-garden soil is frequently too rich in decayed vegetable matter, and has to support a much greater variety of tap-rooted plants, which extract the elements necessary for their growth from the soil. For this reason the main crop for winter use should be grown in a similar manner to main crops of Potatoes, outside the kitchen garden proper; and if fresh land be available every year, the results may confidently be expected to be beneficial to both. In light dry soils well decomposed manure must necessarily be supplied; for if the young plants lack nourishment sufficient to ensure a brisk healthy growth, insect plagues invariably attack them in dry periods, and the crop will be hard and stringy. But perhaps the most difficult soils to deal with are stiff, cold, retentive ones, for without a good seed-bed successful results are well-nigh hopeless. Under such circumstances it is a good practice to draw deep drills the required distances, and fill them up with light rich soil, wood-ashes, bone-dust, or guano, in which to deposit the seed, whereby the young plant gets quickly into rough leaf, and grows out of the reach of insects.

In dry soils Turnips are often, in hot seasons, not only of inferior quality, but it is also difficult to get the seeds to germinate freely and regularly, and to induce the young plants to make a sufficiently rapid growth to escape the ravages of the fly. Where a piece of cool-bottomed land that has been well manured and deeply dug in the previous autumn or early winter can be reserved for the main crop, the chances of obtaining good succulent roots are pretty well secured. But if (as frequently happens) the Turnip crop has to succeed another crop only just cleared off, the following is probably the best plan to secure good plants and induce a rapid growth. After the land has been manured with thoroughly decayed manure and dug over (it is a bad plan to dig long manure into land that parts with its moisture rapidly any time during the spring and summer), spread on the surface a good dressing of burnt earth or charred rubbish, and in raking down the surface this will mix well with it, and will not only act as a valuable manure, especially suitable for Turnips, but will also tend to retain the moisture in the land. By a little forethought in the periodical clearings of the rubbish-yard, a heap of this kind of material can always be held in reserve for such emergencies. After the land has been thus prepared, wait for a shower, if possible, before sowing the seed. If this cannot be done, sow in drills, drawing the drills rather deeper than would be necessary for early crops, so as to lay the seeds in the moist soil which is generally found under the surface if the land has lain two or three weeks after being worked to consolidate. If the weather continue hot and dry, shade, in order to assist the land to retain its moisture, which is done in the following way; and this not only keeps the soil comparatively cool, but also keeps small birds from pulling the plants up as fast as they appear, in order to get at the seed. If, then, the weather be dry and hot, and the seeds do not germinate quickly, a number of short forked sticks, pushed into the bed at intervals of 3 ft. or 4 ft., and over them suspended one or more lengths, as may be necessary, of Britain's netting, may be employed. It is kept about 1 ft. from the ground on all sides; there is thus a continual circulation of air. But the ground, being shaded from the hot sun, retains its moisture, the seeds vegetate strongly and rapidly, and, as soon as the plants are fairly up, the nets are removed and the hoe used regularly. There is nothing like a frequently-stirred surface to encourage rapid growth, and rapid growth is essential to mild flavour in vegetables.

**Varieties.**—Early White Dutch: this was formerly almost universally grown for the earliest crop, but is superseded by varieties that continue fit for table longer. It is, however, a very useful variety, either for the very earliest or for the latest crops.

Navet des Vertus: an oblong French early variety of good quality, which, when the oblong form is not objected to, is sure to give satisfaction.

Early White Strap Leaf: an excellent rapid-growing variety, with small crown of long strap-shaped leaves.

Early Six Weeks: a rapid growing variety, good for summer use. Various selections pass under various names.

Red American Stone: a medium-sized variety, skin dark when exposed, flesh clear, white, and firm.

Cattell's Silver Ball: round, white, excellent variety.

Early Snowball: good for general crop.

Jersey Navet: an excellent oblong hardy variety, the roots being well protected by burying themselves in the soil; mild, sweet flavour, excellent.

Green Top, Six Weeks: round, white, hardy, and good.

Orange Jelly or Golden Stone: a Cheshire variety of handsome form and excellent quality, and, when the colour is not objected to, should be largely grown for main crop.

Chirk Castle Black Stone is perhaps the hardiest and best variety for winter use, especially in cold localities; for, although the skin is black, the flesh is white as snow, and of excellent quality.

There are other equally good and useful varieties, but a selection of four or five really good kinds that are found to suit the locality are sufficient for the largest establishments.

**Insects, etc.**—The principal enemies to the Turnip are the Turnip fly and caterpillar, a long account of which is given in our chapter on receipts, at the end of the book.

**Culture in Market Gardens.**—Spring Turnips are produced in quantities round London; but supplies for summer, autumn, and winter, are mostly furnished from a distance of ten or more miles from the Metropolis. The Fulham Fields and Greenwich Thames Level are too high-rented to be devoted to late Turnip culture, but early outdoor and forced ones are raised in these districts in large quantities. The Early White Dutch is the variety commonly used for spring work. The seeds are sometimes sown on gentle hotbeds under frames, and sometimes on similar beds covered with litter or hoops and mats. When grown under frames the routine is the same as that practised with most kinds of plants raised from seeds. The method of growing them in hotbeds without frames is as follows:—Pits are cast out 18 in. deep, 6 ft. wide, and of any length, and firmly filled with manure; over this a coating of soil is placed and rolled or beaten solidly with the back of a spade; the seed is then sown, slightly covered, and finished off by rolling again; hoops and mats are then fixed over the beds, and, in the event of hard frosty weather setting in, some strawy litter is added to the covering. If at all practicable, the mats are partly unfastened and let down every day, so as to admit light to the young plants; and as soon as it can be done with safety, they are removed from the beds altogether, but are left erect around their sides in order to ward off winds. Turnips are sometimes grown without the aid of either frames or hoops and mats, on hotbeds like those just described, and in this way are excellent Turnips produced. When the seed is sown the beds are merely protected by means of a layer of litter, which is put on and off as in the case of Radishes. The earliest sowing is made in the last fortnight of January or early in February; and main sowings of the Early White Dutch, or White Stone, but generally the former, are made broadcast on a field about the end of February, or in March, to be succeeded by another sowing made in April. After the plants come up they are thinned, and the surface-soil is at the same time loosened by means of small hoes. The largest roots are first drawn for market; thus the plants get thinned, and those that remain have more space for development. Some use the space between the lines of frames for growing Turnips; and well it answers for that purpose, as, owing to the soil being under the general level, it keep comparatively moist, and the belts of frames protect them considerably from inclement weather. Spring Turnips are generally got off the ground in good time, to permit of its being cropped with French Beans, Summer Cabbage, Spinach, or Celery. Turnips for autumn use, and also the winter ones, consist chiefly of the White Stone, a beautiful white-rooted sort, which cultivators generally sow on ground just cleared of Peas, and send to market in winter. In February, Turnip Greens are usually a valuable part of the crop.

## Watercress

### (*Nasturtium officinale*).

*This is without* doubt one of the most, if not the most, appreciated *salads in cultivation*. It is extensively grown round London for market, where it always has a ready sale. It is said to possess strong anti-scorbutic properties. Watercress may be had in good condition at nearly all seasons of the year; for although a running stream is most suitable for its culture, yet it may be successfully grown in any moist, shady situation, or even in pots or pans placed in hothouses, in which case it requires good drainage and frequent soaking with water at the roots; for if once allowed to become dry it is to a great extent spoiled. There are several varieties of Watercress,—some with large brownish leaves, and others with green leaves; the latter is the one generally cultivated for market, and may therefore be considered the best. It may be propagated from seed, but the general way is by division of the roots, which are easily obtained by the side of running brooks or rivulets. Wherever there is a ditch, or any place through which a current of water flows, provided it is not too swift or too deep, Watercresses may be easily grown. Watercresses are largely grown in France, and the following is the mode of culture:—

The water from springs is utilised in the cultivation of this plant, which was first commenced in the neighbourhood of Senlis, on the banks of the Nonnette, in the beginning of the present century. The ground in which the Watercress is cultivated is situated below the spring which feeds it. Across the slope a series of trenches is dug, which communicate with each other, and the flow of water is regulated by little sluice-boards placed at the point of communication. The trenches having been completed, and the communication with the spring cut off by the first sluice board, the Watercress is sown in spring at the bottom of each trench, which has been previously cleaned out, and from which every aquatic plant that might prove injurious to the crop has been removed. Instead of sowing, some cuttings might be planted in August in the bottoms of the trenches, after the ground has been moistened by admitting a gentle stream of water. These cuttings are placed 5 in. or 6 in. from each other. In a short time they take root, and the plants soon cover the surface; the sluice-boards are then raised, and water is admitted to the depth of 5 in. or 6 in., which will be found sufficient. If the plants have been well taken care of, well selected, and well cleaned from every parasitical incumbrance, the Cress-bed, once established, requires no other care than to be guarded from the frost. In order to do this, the water is allowed to rise and cover the Cress while the frost lasts; but, as soon as the weather becomes mild, it must be let off to its former level, as continued submersion injures the plants. There should be an outlet from the spring not communicating with the Cress-bed, which should be opened in times of thaw or heavy rains in order to prevent the trenches being overflowed to the detriment of the plants. It is a good plan to protect the trenches from cold and heat by means of hedges planted in the intervals between them; but the leaves from these hedges should not be allowed to get into the trenches, otherwise the Cress will be smothered and cannot grow. This evil may be prevented by fixing *a trellis or mats* on each side the hedges. The Cress is gathered placing a strong plank across the trench; the Cress may be cut with a pruning-knife, but it is better to nip the shoots off with the thumb-nail one after another, as by this method the plants are not disturbed at the roots.

During summer, as long as the season is favourable, a trench may be visited, and the plants cut or gathered, every three weeks; but, if the season be cold, we must wait two months before making a second cutting. When the gathering for the year is over, the trench is left dry, and a light layer of well-decomposed cow-manure is spread over the entire surface, after which the plants are pressed down with a plank, which has a long handle at each of its extremities. Two workmen take this implement, and as they go from the end of the trench, press down the plants which have been raised at the times of gathering. A Cress-bed will last a long time if carefully managed; but, as it is seen to be running out, it should be renewed. In doing this, the plants are pulled up by the roots and laid on the spaces between the trenches; the trenches are then dug over, and manured with well-decomposed cow-manure; after which the Cress is replanted as at first. Some growers take up the plants every year, remove the mud from the trench, dig the bottom over and manure it, after which they replace the old plants. For supplying water to, and emptying, the Cress-beds, stoneware pipes 3 in. in diameter are used. The water must be allowed to run freely, if it be desired to have Cress of a good quality. The sluice-boards are only used to stop the water in frost, and to let it off during a thaw or heavy rains. The seed is gathered from the finest plants in each trench in August. It keeps good for four years.

## Witloof.

THIS vegetable is the head formed by the radical leaves of a peculiar variety of Chicory which has been called the Large-rooted Brussels Chicory. It bears much resemblance to the Magdeburg kind—which, in fact, may be used in the same way; whilst the Brunswick sort is, on the other hand, totally unadapted for the purpose. In Paris, the Barbe de Capucin, which is Wild Chicory blanched, is a very common salad plant. Its slender roots, which are seldom thicker than a lead-pencil, terminate in white leaves which attain a length of 7 in. or 8 in., or more. In the Witloof, on the contrary, the root is thick and stubby, and carries a head of erect leaves that are stout, thick, and imbricated, forming a small compact head, which reminds one of the heart of a Cos Lettuce. In fact, except as regards whiteness, which is common to both when blanched, the Witloof is in all respects the very opposite of the Barbe de Capucin. The Witloof, unlike that kind, is brought to market deprived of its root, which is cut off a little below the leaves, as is done with the Dandelion. It is extremely tender, and has an agreeable, but slightly bitter flavour, which reminds one of that of Endive.

In Brussels the heads of the Witloof are cooked whole, and eaten with white or cream sauce; but it is equally good as a salad. It is all the more valuable on account of its being obtainable at a season when other vegetables are comparatively scarce,—the markets of Brussels being supplied with it from Christmas till Easter, and later. The seeds of this variety are sown during the first fortnight of June, in good and rather deep garden soil. The only care to be taken is not to crowd the plants too much. The roots should be about 4 in. apart, in order that they may be thoroughly developed, for upon the size of the root the beauty of the head in a great measure depends. From the end of October to that of February a trench from 3½ ft. to 5 ft. wide, and from 8 in. to 16 in. in depth, is opened in a favourable part of the garden. In the bottom of this trench, after having cut back the leaves to a length of about 2 in., the roots are planted upright, or very slightly inclined, at a distance of 1 in. from one another, and in rows about 8 in. apart. Between the roots light soil or compost is placed, so that no space may be left, and finally the surface is covered with about 3 in. or 4 in. of this light soil. The planting is then finished, and the development of the leaves now only depends upon the heat applied. The system of heating adopted in Belgium consists in putting a bed of fresh stable manure, of the thickness of from 2 ft. to 3 ft., over the plants. This, perhaps, is a somewhat primitive and expensive method of forcing, as by it a large quantity of manure is required and much trouble involved,—for example, it is necessary to cover the manure with planks to protect it from heavy rains,—and it is quite possible that less costly methods of treatment might easily be discovered. However this may be, if the heat be sufficient, the heads are fit for cutting a month or six weeks after it is applied, and will then measure from 3½ in. to 6½ in. in height by 1 in. to 2 in. in diameter. The heads are cut before the leaves reach the manure —in fact, when they are an inch or two from it,—and this saves them from being embrowned and spoilt. The word Witloof means literally "White leaf."—*Journal de la Société Centrale d'Horticulture.*

## Yam

### (*Dioscorea sativa*).

THIS is a native of Europe and some parts of Asia, and is cultivated in every country the climate of which is favourable to its growth. Like all plants that have, for any length of time, been subjected to cultivation, it has sported into a large number of varieties. It rarely flowers in northern latitudes, and is perpetuated by means of tubers and cuttings. Yams are, so to speak, the Potatoes of inter-tropical climates; and they furnish, from an equal area of ground, far larger returns than those of the common Potato. Their tubers, cooked in their skins in an oven, afford an agreeable food,—which some, however, object to on the score of sweetness. The varieties most common are the Rose of Malaga, or Algerian Red, the Argenteuil, and the Yellow Yam; all of which are distinguished by the size of their tubers. There are also white

Yams, but these are less choice than the red, rose, and yellow varieties. If flavour only be considered, the Red Algerian should occupy the first rank; but it is much less productive than the yellow variety, which, on that account, is to be preferred. It must not be forgotten, however, that the quality of Yams, of all colours, is modified according to the soil and climate in which they are grown; and this fact explains the wide divergence in the opinion of gardeners as to the relative merits of the different varieties. The culture of Yams cannot always be conducted in the same manner. In the south of France they are not more difficult to grow than Potatoes. There they are planted in spring in ground that has been well tilled, and which has been divided into ridges, on the summits of which the plants are set. The ridges soon become covered with haulm, and are abundantly irrigated. The method of forcing is as follows:—In January, well-formed healthy tubers are selected for the purpose, and are placed upon a hotbed under a frame, on the top of which straw is, in addition, laid at night. After a few days these tubers begin to vegetate. When the shoots have attained a length of 2 in. or 3 in., they are removed with a small portion of the tuber attached to each, as in the case of Dahlia cuttings, and are then potted separately in small-sized pots, which are plunged in the hotbed and covered with cloches. When the sets have taken root the cloches are raised by degrees, so as to gradually harden off the plants, but without exposing them to cold. They are planted out permanently during the first fortnight in February in a bed composed of equal parts of manure and leaves, to which should be added 25 per cent. of good garden soil, and frames are put over them. If the bed cool down too much, the heat should be kept up by means of fresh manure applied from time to time. As the plants increase in size, and the outside temperature rises, air is given; and they are wholly exposed when the weather has become warm. If the planting have been properly effected, by the end of May or the beginning of June tubers may be obtained of a useful size without altogether lifting the plants, which will continue to grow until frost sets in. For a second crop of Yams, planting takes place in April upon beds made up as for Melons,—the sets being covered with cloches, which are protected during the daytime from hot sunshine, and that are raised gradually when the roots have struck. A little later, these cloches are wholly removed,—that is, when they no longer cover the haulm of the plant. Yams may again be planted in May or June; but the sets must then be taken from developed plants, because the tubers of the preceding year cannot be preserved up to so late a period. The stalks, besides, easily take root by layering, and without detaching them from the parent plant; and the individual plants may, by this means, be increased to an almost indefinite extent. Sometimes as much as from 30 lb. to 40 lb. of tubers are produced by secondary plants obtained from a single stool, of which the branches have been layered into the soil; and the more the latter has been enriched by leaf-mould, the larger will be the produce. The method of culture which we have just described is that most commonly practised; but to this there are exceptions, one of which, recommended by the French Horticultural Society, ought to be made known. This method, which is simpler than the ordinary one, and gives also larger returns, was based upon the experiments of MM. Penault and Pissot: but is not always practicable. The tubers are placed in a hotbed under a frame; but instead of removing the growths in a few days for the purposes of propagation, they are allowed to develop themselves upon the bed. When they are thoroughly established, the largest are chosen, and are cut into pieces, with at least three leaves attached to each piece—sloping beds, composed of the materials of a spent hotbed, having been previously prepared. Holes are made in these a yard or so apart, 1 ft. in depth, and 16 in. in width; these are filled with old peat soil, the refuse of the potting-bench, and in each of them is planted a set. A good watering is then given, and the sets covered with cloches, and shaded until they are rooted. By the end of a month or so the cloches may be taken off, and tubers will have commenced to form upon the young plants. The stems which spread over the surface of the soil root rapidly into it, and produce fresh tubers, but these latter are generally too late to ripen (at least in the climate of Paris), and whilst growing they rob the main crop; their development should, therefore, be prevented by lifting the plants from time to time and breaking off the roots. By thus husbanding the strength of the plant, enormous tubers are obtained from a very limited space, and it is by no means an uncommon thing to gather as much as 20 lb. from one plant. It is sometimes a matter of surprise that a plant so productive is not more generally cultivated; this is to be attributed to one cause only: the difficulty of preserving the tubers, which are very liable to rot in northern climates, in which they only get half ripened. Under such conditions, much care is necessary to make them last through the winter—that is to say, until planting time has arrived. The tubers must be lifted before frost sets in, for, if even subjected to a white frost, they inevitably rot; a dark, cool, but not cold, cellar is the best place in which to store them. Under these conditions they may be preserved until the end of January; and they can be kept a little longer by storing them in boxes in alternate layers of fine sand or very dry peat—the latter being the best. The boxes, having been filled and closed, are placed in any dry room where the temperature does not fall below 40° Fahrenheit.

**The Chinese Yam.**—When this was first introduced into Europe it was thought that it would form a good substitute for the Potato, the extinction of which then seemed inevitable. It was, however, soon discovered that this could never be the case, inasmuch as its long wide-spreading stems required to be propped up, and its tubers did not keep like those of the Potato. Moreover, the tubers attain a length of from 2 ft. to 3 ft., and, pushing down vertically, are difficult to harvest, except at great expense and labour. The field culture of the plant was, therefore, abandoned, but it was grown in gardens as a fancy vegetable; its culture has, however, never proved profitable to those by whom it has been undertaken. Its greatest fault is the length of the root, the fleshy part of which alone is usable. This renders it almost impossible to dig it up with ordinary cultural implements. The tubers are, moreover, extremely fragile, and frequently break off in the middle,—a circumstance which puts an end to all hopes of preserving them from rot. Another fault is that the tubers only become fully developed after they have been in the soil two years; and this is incompatible with the rapid way in which crops are raised in market gardens. This Yam is, therefore, seldom seen outside private gardens. In its favour it may be said that it produces abundantly, and in this respect may be even made to excel ordinary kinds of Potatoes; but, in order to obtain such a result, it is necessary that it should be planted closely, say eight or ten plants to the square yard, and the extraction of the tubers really amounts to deep trenching,—an operation the cost of which is not likely to be covered by the proceeds of the crop. Culture upon ridges 18 in. or 2 ft. high has also been attempted; and it has been found that, though by this means the plants are lifted with much more ease, the produce is less than on level ground; it is also an ascertained fact that the large-sized tubers are only produced where the runners are propped up. The Chinese Yam, although abandoned so far as its tubers are concerned, is frequently grown for forage in certain soils. It will grow anywhere, but is peculiarly adapted for light sandy soils when they are deep and retain moisture. The haulms, which are abundant, make good green food for cattle; the bulbils are excellent food for pigs; and the tubers, which are too deeply embedded in the soil to admit of these animals uprooting them, serve to reproduce the haulms year after year. Planting is effected in March or April, according to the climate, etc.; the crop is lifted in October, when the yellow colour of the leaves indicate that the tubers are ripe. Lifting the tubers should be done with care, in order to avoid injuring them. Exposed for a few days to the air, they lose some of their moisture, and may then be stored in a cellar. They keep, however, better in the ground, where it is best to retain a portion of the crop until the following spring, lifting only those required for winter use.

**Dioscorea Decaisneana.**—This Yam also came from China, and is probably a variety of the former kind. It is the same in appearance, as far as leaves and flowers are concerned, but is a less robust growing plant. The greatest difference, however, lies in the tubers, which are round, and produced close to the surface. They are scarcely larger than ordinary-sized Potatoes, and in quality are inferior to the Chinese Yam. Quantities of bulbils are produced on the haulm, about the size of Peas, which, if sown broadcast in good soil, would produce good forage for cattle, and the tubers might be used in other ways.

## A Chapter on Salads.

In the production of Salads English gardeners are far behind the French—especially during the winter season. There are several things that have assisted in causing this state of affairs. In the first place, we are not such a salad-eating people as the French, although the demand for this kind of garden produce even in our country has been, and is, continually on the increase; secondly, although our climate may not show a much lower temperature in winter, the more frequent changes from frost to thaw to which we are subject, and the much more humid state of the atmosphere in this country, are conditions so trying to vegetable life that the growth of good salad plants is more difficult with us; lastly, the appliances generally in use in this country for growing winter salad plants are such as to prevent us producing them in the high perfection that elsewhere can be attained. Again, in France there are many plants used for salads that with us are not generally liked: for instance, blanched Chicory, which on the Continent is so largely used, finds little favour in England, few liking its flavour. In addition to Celery, Beet, and similar plants which are to be found through the season in any well-managed garden, our salads may in a great measure be said to consist of Lettuce and Endive, with Mustard and Cress; in fact, Lettuce and Endive are essentials for a salad, and it is in the production of the different varieties of these that we are behind our Continental neighbours. It is the use of the cloche that enables them to produce in such excellence their salad plants. The plants have a healthy and comfortable appearance under these glasses, which are greatly superior to any other contrivance of the same nature. Even the useful old hand-light, when made of iron, and constructed on the best principle, with a movable top, is much inferior in one important respect—viz., the deficiency of the light it admits as compared with the cloche, which, when made of good clear glass, enables the plants under it to receive as much light as if they were fully exposed to the open air. Any one who has seen Lettuce and Endive grown under them cannot fail to have noticed how much sturdier in growth the plants are than those grown in frames. This is owing to the uninterrupted light they receive in every direction. The importance of light to most cultivated plants is admitted on all hands; yet we do not appear to realize the necessity of affording plants grown under glass coverings the greatest amount possible of this life-giving element, which to plants composed of soft, watery tissues, such as those under consideration, is even more necessary to enable them to withstand the incessant fluctuations of our variable climate than it is to those kept out of the reach of frost or damp. Several contrivances have made their appearance besides the ordinary garden frames, in the shape of small frames, some with earthenware sides and ends, made to take to pieces easily, and with glass to cover them in; others are made of wood but the common fault of all these is that they only give light from above, whereas the cloche admits it all round. Light is the great compensator for the deficiency of air, which plants cultivated under glass must of necessity be subject to; and for such plants as can be grown under it the cloche has no equal, admitting as it does a full volume of light, and enabling salad plants, which the French gardeners grow under them, to thrive with the comparatively small amount of air they receive throughout the winter. To grow these plants well, they require something more than the mere care that will suffice to keep them alive. There must be constant attention to produce salad materials in good condition every day in the year, especially through the winter months. One objection raised against the cloches is their liability to break; but surely this is anything but a reasonable objection, for it might be raised more or less against all the light-admitting appliances that gardeners have to deal with. If reasonable care be used there need be no serious amount of breakage.

Of the infinite variety of salads which can be made from wild plants—the Salad Burnet, the Ladies' Smock, the Stonecrop, the Sea Blindweed, the Sweet Cicely, the Buckshorn Plantain, and the Ox-eye Daisy—our people know next to nothing, and allow quantities of excellent food to be wasted on cattle. The Dandelion, which is a favourite salad in France, and a herb renowned for its virtue, we seldom see on our tables. Nothing will do for us but the most highly-cultivated kinds. First of all there is the Lettuce, which is of two sorts—the Cabbage Lettuce, known in France as the Laitue pommée, and the Cos Lettuce, which the French term the Laitue romaine. Of these—and there are endless varieties of either—we seem in England to prefer the latter, with its long leaves, because it can be eaten by itself, while the French probably care more for the former. Then comes the Endive, in three classes: first, the Broad-leaved or Batavian Endive, which the French call Scariole—a prime favourite; next the Curly-leaved Endive, which the French call sometimes Chicorée and sometimes Laitue frisée; lastly, the wild Endive or Succory (Succory being but the old English word for Chicory), which is called by the French Barbe de Capucin. Perhaps next in order of rank deserves to be mentioned the Celery—but we only use the bare stalk, whereas the French put the whole plant into the salad-bowl, from the root at one end to the leafage at the other. Even better is the Celeriac—that is, a Celery with Turnip-like root—the Céleri-rave of the French and the Knott-sellerie of the Germans. The latter are especially fond of it, and go into ecstasies when they talk of it. In England, although it may be cultivated with greater ease and at less expense than the common Celery, it is slighted; though, served up with a dash of Red Cabbage, it is particularly alluring. Then there is the Tomato salad; but for that matter Tomatoes are plentiful enough, and ought to be in everybody's reach. The wonder is how any one who knows what a superb salad raw Tomatoes make can care to desecrate this glorious Apple by cooking it. Then there is the Corn-salad, the Beet-root salad, the Potato salad, the Salade de légumes; and the minute accessories—the Tarragon, the Chervil, the spring Onions—which when cunningly applied give a gaiety and sparkle to the composition. There are salads in abundance, and with a little trouble we can have them in perfection.

Ordinary Buckwheat, such as is given to fowls, if grown in a moderately warm house and cut in the same manner as Mustard and Cress, makes a delicious winter salad,—a combination of Lettuce and Corn-salad in flavour. It can be grown in pans all the year round without the least trouble, and even when Lettuces are plentiful will be found a very valuable addition to the salad bowl.

**A New Salad.**—Amongst the already great variety of vegetables which, in addition to the universal Lettuce, are used by the French as salads, there is Centranthus macrosiphon—a plant formerly cultivated for the sake of its handsome rose-coloured flowers only, but now considered a really good material for a salad. As it belongs to the Valerian family, it might be supposed to possess some of the properties of the Corn-salad, so popular with the Parisians; but it appears to combine all that belongs to the Corn-salad with a peculiar slight bitterness which imparts to it a most distinct and agreeable flavour. It is very easy of cultivation, being sown permanently in beds like the Corn-salad, and care being taken not to cover the seed too deeply. It is best to allow the plant to be pretty well grown before cutting it, as its peculiar flavour is more pronounced in the mature than in the young leaves.

# THE HERB GARDEN

SWEET OR POT HERBS do not always receive that attention which they deserve; on the contrary, if they exist in gardens at all, it is only in out-of-the-way corners. This may be ascribed to the fact that in some establishments many of them are seldom or never asked for. In many gardens, however, it is found necessary to grow them, as it not unfrequently happens that certain kinds, which may not have been required for years, will suddenly become indispensable, and they are always expected to be forthcoming when wanted. In many instances, it might be worth while endeavouring to grow these plants in a somewhat more attractive and systematic manner than is generally done; and, to accomplish this, a garden or a herb department might readily be formed in any convenient situation, either inside the kitchen garden or elsewhere, which might, with little trouble, be rendered interesting as well as useful. This garden, or department, should be laid out in the form of a series of beds, or clumps of various forms and dimensions, in the style (but, of course, upon a small scale) which we generally see adopted in botanic gardens. These beds or clumps might be separated from each other by narrow gravel walks, which should be edged with the common dwarf Box, variegated Thyme, or any other suitable plant; and the numerous varieties of herbs should each occupy beds or clumps suited to their habit of growth and other circumstances. The perennial kinds should be occasionally divided and transplanted, while annual species, such as Sweet Basil and others, might be sown at once in the beds which they are intended to occupy; or the seeds may be sown under glass, and the young plants afterwards transplanted into their respective beds.

There is likewise a great saving of time in growing all the herbs together; one always knows where to go for them, and several are mostly wanted together. The herb garden is likewise a pretty feature in itself. A series of beds, say 6 ft. long and 3 ft. wide, parted with tiny walks 1 ft. broad, has a neat, orderly appearance. But the chief advantage of having a garden of herbs is that, when *disposed* thus, they are almost sure to receive the requisite degree *of attention.* When each has a bed, we like to see each bed filled *with healthy* plants. Some herbs, such as the Mints, on most soils *grow like* weeds. Others, such as Fennel and Tarragon, are shy growers, and winter badly in many gardens; others, again, such as Golden, Common, and Lemon Thyme, and especially Pennyroyal, require frequent removal. The last should be replanted every autumn. Large plants have their crowns frosted out in winter, and the whole plant frequently perishes. Small rooted pieces from the extremities of the growing shoots planted in October will bear any amount of frost with impunity. Hyssop, Winter Savory, Winter Marjoram, and Sage do not need renewal so frequently; and the bitter or strongly aromatic herbs, such as Rue, Horehound, Rosemary, Tansy, Wormwood, etc., are equally hardy, and even longer-lived. Feverfew makes a good edging to the other beds, and Lavender is best grown in the shrubbery. Such large herbs as Angelica and Caraway, and even Borage, should be grown in rows near to Rhubarb, Globe Artichokes, or other strong vegetables. Several beds should likewise be retained for growing such annual herbs as Basil, Marjoram, Savory, Chervil, Purslane, Pot Marigold, etc. Hot or bitter plants for eating green as relishes, or for salads, such as Mustard, Cresses of various kinds, Pimpernel, Chives, green Onions, Radishes, should also be grown in the herb garden, where various plants, such as Curled Mallows, and others for garnishing, might also find a place. Parsley is too important a crop to be grown in the herb garden, unless it can be treated to deeply-trenched, rich land.

## Anise or Aniseed

(*Pimpinella Anisum*).

THIS is an annual, and a native of Egypt. It is grown in this country almost exclusively for medicinal purposes—the well-known anise seed of commerce being produced by it. It is rarely grown in gardens for culinary purposes, for which the leaves only are used. It requires a warm situation, and should be sown in heat and planted out rather thickly in May, and in light, rich soil; or it may be treated generally like Sweet Basil.

## Angelica

(*Archangelica officinalis*).

THIS plant is seldom found in its wild state in Britain, although it has been seen growing most luxuriantly in several places in Devon; and, about Exmouth, it grows on the high banks, under the cliffs, high up on the shelves and crevices, and on the top of the cliffs, most luxuriantly. Owing to its winter and very early season's growth, with its clean, shining foliage of such a beautiful green, and its very early flowering, it really makes a most handsome and interesting plant for the wild garden, nooks of shrubberies, and wood-side walks. In warm districts it commences its growth in autumn, grows on the whole of the winter while the weather keeps open, commences starting its flower-stalks in *February, and is* in full blossom early in March. It grows from

3 ft. to 4 ft. 6 in. high, and is really a very interesting sight, with its fine foliage, luxuriant stalks, and large heads of bloom, as seen in the Primrose-blooming season, and before even the wild Parsley is in bloom. It is more used in confectionery than otherwise; yet many like to have a bed of it for the sake of its appearance, and it grows very well on almost every kind of garden soil—but best in those that are moist and deep. It is readily propagated from seed, which should be sown thinly in early autumn (August or September), or in spring; and, as it is a very strong grower, each individual plant should have plenty of room to grow—3 ft. apart will not be too much. It should not be allowed to go to seed, unless in the uncommon case of seed being required. It is stated to be a biennial in the gardening books; but we have found it endure from year to year like any common perennial. It would be more likely to exhaust itself if allowed to flower. The stems, if required for candying, should be cut down in May. In the north of Europe it is used as a vegetable and condiment, but in this country chiefly for confectionery.

## Balm

(*Melissa officinalis*).

This is a native of the south of Europe, and is a hardy perennial, which will succeed in any ordinary garden soil. It is easily increased by division of the roots in spring. It should be cut down just as it is coming into flower, and dried in the shade. Balm, as is well known, is a strongly scented plant, little, if at all, used for culinary purposes; but it is used for the purpose of making a kind of tea, and a wine is also sometimes made from its green leaves and shoots.

## Sweet Basil

(*Ocimum basilicum*).

Being an Indian annual, this plant is consequently tender. Its seeds should be sown about the middle of April, in a genial temperature, and when the seedlings are large enough to handle, they may be potted off singly, or they may be pricked into boxes or seed-pans, or into a frame on a slight bottom-heat, from which they should be transferred to their positions in the open air about the beginning of June—for, owing to the plants being exceedingly tender, this can seldom be done with safety at an earlier period. Sweet Basil succeeds best in a light, rich soil, in which the plants should be inserted at a distance of 6 in. or 8 in. apart; and they should be well watered until they become established. As soon as they come into bloom they should be cut down to within a few inches of the ground, and the portion cut off should be tied up in small bunches and dried in the shade for winter use. As, however, green Basil is frequently required, the plants which have been cut down should have the soil surrounding them slightly stirred up, and the bed should receive a surface-dressing of fresh soil, when the plants will quickly form themselves into healthy little bushes, which will furnish a supply of green leaves until about the beginning of October. A portion of them should then be lifted and potted, or planted in boxes, and should be placed in a somewhat genial temperature, where they will continue to furnish a supply of green leaves when required throughout the winter.

## Borage

*(Borago officinalis).*

THIS, although usually considered a native plant, is more probably a naturalized one, its native home being the eastern shores of the Mediterranean. It is a vigorous annual plant, which there can be no trouble whatever in cultivating. It often comes up from self-sown seeds, and may be sown at any time, though it will be most convenient to do so with the general crops in March, and in drills 12 in. or 15 in. apart. If a succession be wanted, it may be sown at intervals of six weeks from March to August. Seed may be saved by cutting the heads off the plants before the greater number of seeds are ripe, and placing them on a newspaper or piece of cloth in a dry shed or room; but this is not worth while, as the seed is so cheap. Being a vigorous plant, it might be readily naturalized in some half-wild spot, and this might suit those who forget to sow such small crops.

In Devon it is to be found among the corn crops everywhere—too much of it in many places to be profitable; however, the flowers are of a beautiful and interesting blue colour. The young shoots or tops are sought for use, just as the first blossoms are opened, by the housekeeper, butler, and confectioner, for making various cup drinks and flavouring and colouring other things.

## Burnet

*(Poterium Sanguisorba).*

THIS plant is a hardy herbaceous perennial, indigenous to Britain. It will grow in any ordinary light soil, and may be increased by dividing the roots in spring, or may be raised from seed, which should be sown at the same season of the year, and the young plants should be thinned out to a distance of 6 in. or more from each other. The flower-spikes, as they appear, should be removed; this will give increased luxuriance to the leaves, which alone are in demand, and are occasionally used in soups or salads, also in cool drinks together with Borage.

## Caraway

*(Carum Carui).*

THE CARAWAY is a native of the Continent, and is cultivated *chiefly for its seeds*, which are extensively used in confectionery &

perfumery. Many growers in Kent devote large spaces of land to its culture. The seed is often sown broadcast, but is best sown in drills 9 in. apart, and the plants thinned out to 8 in. apart as soon as large enough to handle. The seed may be either sown in spring or autumn; the former is perhaps the best. Liberal treatment as regards hoeing between the plants and supplying them with water during dry weather is necessary, in order to secure good well-ripened seed early in the following autumn.

**A New Tuberous-rooted Caraway.**—Dr. A. Kellogg has some interesting remarks on a plant with the above name in the *Horticulturist.* "Carum Gairdneri is a very important plant, because it promises much to the gardener and the florist. A particular description is needless,—as in general appearance, and indeed in every way, it is the representative congener of the European Chervil on the Pacific coast. The flowers are of the most chaste white, and for an umbel the neatest we ever saw. We have had it cultivated occasionally, but never with sufficient persistence and care to do anything like justice to it. For this reason mainly we invite attention to it, in hopes that those who can may be induced to prove its value for themselves. What is desirable is so to establish its introduction that from the garden we may possess a new dish of rare delicacy, and another charm for the flower-vase. The roots, as observed, are small, seldom over ½-in. in diameter by 2 in. or 3 in. long, pure white, with a creamy cuticle. Eaten raw, as they are dug, they are delicious; but their sweetness and flavour are greatly improved if kept until about half-dried. There is not the least doubt that, with skill in choice of suitable conditions, soil, etc., from 200 to 300 bushels to the acre could be raised. We have eaten them in soups and various ways, and have often sent the seeds abroad; but their vitality soon perishes, unless great care is bestowed in packing, as well as speed in transit. It is a hardy plant, suited to cold climates, and damp, well-drained, rocky, gravelly or mixed clayey loams, especially 'dry runs.'"

## Chamomile

(*Anthemis nobilis*).

THIS is a native of Britain. It is cultivated for its flowers, which are produced in great abundance during the summer and autumn months. The flowers are used in various ways as a medicine. There are two varieties—single and double; the double-flowering kind is the most profitable one to grow, but it is said that the single flowers are the strongest in activity when used as a medicine. The double-flowering kind makes a very pretty dwarf edging to flower-beds, etc The flowers continue to open until the frost comes. The Chamomile will succeed on any soil, providing it be well drained. It is propagated by division or offsets, which are pricked into beds in rows 9 in. or 12 in. apart each way. If this be done in the spring (say in April), and the plants kept shaded and watered until the roots have taken hold on the soil, they will soon cover the bed. The flowers should be gathered when they are dry, and as fast as they open, and be exposed to the sun, and constantly turned until thoroughly dried, when they may be put into paper bags and hung up in any dry place.

## Chervil

### (*Anthriscus Cerefolium*).

Of this there are but few varieties: viz., the Common Chervil, Curled Chervil, and Tuberous-rooted Chervil (Chærophyllum bulbosum). The leaves of the two former varieties are used in soups, salads, etc., and will also answer well for garnishing. The tuberous-rooted kind is grown for its edible roots. It is, however, little grown in this country; but in France and Germany it is largely cultivated by many. All the kinds are natives of Europe.

**Common Chervil.**—This graceful little plant is cultivated to a large extent in Continental gardens, and also in our own. It is a native of south-eastern Europe, an annual, and requires a little more trouble to have in perfection than perennial herbs. It and all the annual kinds of herbs, etc., should be grown together, for convenience; and it should be sown in succession from the end of February till September, if a constant supply be wanted. In the market gardens of Paris this plant is grown to great perfection on the light, very rich, and well-watered soil common to those places. It is often sown among other crops, and pulled and used before the others require all the ground. It may be sown broadcast and raked in, or in shallow drills about 8 in. apart, and very lightly covered. There is no occasion to sow it in a shady situation in summer, provided the soil be light and deep, and not such as will harden and crack up with a few days' strong sun. The Curled or Parsley-leaved variety is the prettiest, and in many large families it is as much sought after for soups and salads for every day in the year as Parsley. To cultivate it well for a daily supply it requires, as with other things, a little method and forethought. Grow the pretty Fern-leaved Curled variety in a rich, open, well-pulverised soil. For standing the winter, choose a warm sheltered south or south-west aspect or corner about the 12th or 15th of September; sow broadcast thinly or in drills, which should be 8 in. or 9 in. apart, and thin the plants to 5 in. or 6 in. asunder in the rows; make another sowing on the same aspect the first week in October, thus securing a winter and early spring supply. This time sow thicker and thin less; and, in order to have a portion unaffected by snow or severe frost and easily obtainable at all times, give it some temporary protection, such as a shallow frame, consisting of four boards nailed together and covered with old lights, canvas, well-oiled thick paper, or thatched neatly with clean straight straw, Evergreen boughs, Fern, or any material of that kind. Sow again in boxes or pots in January, and place them in gentle heat; and make another sowing in February on a warm border. Sow also in April, and during the *next three months* a row here and there between Raspberries, Gooseberries, or other bush fruit, for the sake of partial shade, or on a north border or cold damp bottom: thus a plentiful supply of luxuriant, good-coloured Chervil may be had every day in the year. Large quantities of his herb may always be seen in the Paris markets; and there is much more of it now in Covent Garden than formerly.

**The Tuberous-rooted Chervil.**—This is an umbelliferous biennial, the root of which forms a conical-shaped tuber, blackish-grey outside and pale yellow inside. In substance it is farinaceous, and has a somewhat sugary taste. The tubers, which are edible, have, however, one great fault—that of being too small. It is rarely that they attain a bulk larger than that of a hen's egg, and usually they are about the size of Chestnuts. This plant has long been cultivated in Germany. Like the Skirret, the bulbous Chervil is a vegetable the value of which is disputed, more especially on account of its small produce, which scarcely covers the cost of raising it; but it may be admitted as a fancy vegetable in private gardens where space is no object. Looked at from this point of view, it deserves to be improved; and this has been accomplished here and there with some degree of success by different horticulturists. By planting closely, however, it is possible to obtain tolerably abundant returns upon a small area of ground. The bulbous Chervil is a very hardy plant, which appears to flourish on any soil. A good argillaceous soil, however, appears to suit it best; in calcareous, sandy, or light soils, the leaves are scanty and the tubers are correspondingly small. It is sown in August and September, in ground that has been manured the previous year, and which has not carried during that year a crop of Carrots or other umbelliferous crops. If the weather be dry when the plants come up, water must be given, for they like plenty of moisture. Towards the end of July, or early in August, the leaves turn yellow, which indicates that the tubers may be harvested; it is, however, better to allow them to remain till September, as they are then larger and riper. They may be eaten at once; but it has been noticed that their quality is much improved if they are kept for a month or six weeks, and until some of the moisture contained in them has had time to evaporate. They can be kept in a cellar till February or March; but they are less palatable than if eaten before Christmas. In order to obtain seed, the best roots should be chosen, and planted about 3 ft. apart each way. The top sprouts again in the spring, and the seed is ripe in July.

## Chives

*(Allium Schœnoprasum).*

NATURAL Order Asphodeleæ, a perennial, and a native of Britain; easily increased by division, which should be performed in spring. It will succeed in any kind of soil, and in any situation. Only the green tops are used, and the flavour is that of the Onion, but much milder. It is frequently used in soups, salads, etc. It is much cultivated; or it is, at least, generally found in cottage gardens.

## Fennel

*(Anethum Fœniculum).*

This, when well grown, is a very ornamental plant, a native or naturalized to Britain,—its Fern-like deep-green leaves being in great demand for flavouring fish sauces, etc. During the mackerel season Fennel is in great request, and fetches remunerative prices in the market. The seeds are sometimes used in confectionery, and the stalks when blanched are used for salads. It is easily propagated from seed or division of the roots, which is performed in the spring, and will grow in any moderately rich soil. Pieces of the roots may be taken up and potted, and placed in a warm house or pit, to give a supply during winter and spring. The flower-stalks should be cut off the plants as soon as they appear, as, if allowed to seed, young seedlings come up in profusion, and are difficult to get rid of.

## Horehound

*(Marrubium vulgare).*

This is a native of Britain, and is to be found in almost every garden. It is used as a medicine for cough, etc., for which purpose it is considered to be of great value. It may be easily propagated by cuttings, seed, or division,—the latter being the most expeditious, and the one generally practised. Seed may be sown in April in the open ground, and slightly covered with fine mould. Cuttings strike readily at any time in the spring, if inserted in sandy soil in a shady situation.

## Hyssop

*(Hyssopus officinalis).*

This came originally from the south of Europe. It is a dwarf aromatic evergreen shrub, which may be increased by means of division in spring, by cuttings, and from seeds. It is not particular as to soil. It is but little used for culinary purposes; but it is considered valuable as a medicinal plant, being regarded as a specific in some kinds of chest affections.

## Lavender

*(Lavandula vera).*

This is indigenous to southern Europe, is of easy culture, and will thrive in any ordinary garden soil, but succeeds best in one of a somewhat light, warm description. It may be propagated by slips, which may be detached, with a portion of root adhering to them, from the base of old plants, and these may be planted at once where they are intended to grow; or a better plan is to insert cuttings of the young wood in pots or pans during the autumn, placing them in a close frame or pit, where they will soon strike root, and *may be planted* out, or allowed to remain in the cutting or store pot until spring, when they may be shaken out and planted in beds or lines, as may be desired. Lavender is possessed of medicinal properties; but it is cultivated chiefly for the sake of its sweet-scented flowers, which, in some localities, are extensively used for distillation. The spikes should be cut and dried as soon as the blooms have expanded.

## Sweet or Knotted Marjoram

(*Origanum Majorana*).

This is an annual, and a native of Portugal. Its seeds may be sown in the open air about the third week in April; but it is better to sow them about the beginning of that month in pots or pans under glass in a gentle heat. When large enough to handle, the plants should be pricked into boxes or seed-pans, from which they should be transferred to their places in the open air about the second or third week in May. They should be planted in a bed at a distance of 6 in. or 8 in. from each other, and should be well attended to with water during dry weather until they have become fairly established. As soon as the plants are in flower they should be cut down to nearly the surface of the soil, and the portion cut off should be tied up into bunches and dried in the shade. In nearly all establishments this herb is always in considerable demand for culinary purposes, being used for flavouring various dishes. Pot Marjoram is a perennial plant, and is more hardy than the knotted kind. It is easily increased by division of the roots. It is used for similar purposes, but is less frequently asked for than the sweet or knotted variety.

## Mint

(*Mentha viridis*).

This, which is sometimes called Lamb Mint, is a native of Britain, and consequently perfectly hardy; it will flourish in almost any soil, and in any situation, although a somewhat damp locality suits it best. It is easily propagated by means of cuttings or by division of the roots, and it should be transplanted every two or three years. It should be cut and dried for winter use as soon as it comes fairly into flower; and when this is done the beds should be cleaned and top-dressed, when young shoots will again be produced, which will afford a supply of Mint during the greater part of the winter; when this is exhausted a few pots of it should be introduced into a forcing-house, where it will soon commence to grow, by which means a constant supply can easily be maintained,—and, in many establishments, this is required. The leaves are used in a dry state for soups, and the green leaves and shoots are employed in salads, and are boiled with green Peas and young Potatoes. This Mint is considered to be a valuable anti-spasmodic, and is invariably used for making Mint sauce.

## Parsley

*(Petroselinum sativum).*

THIS is chiefly a native of Eastern Europe, has been in cultivation in England from time immemorial, and still constitutes one of our most useful garden herbs.

**Culture.**—Though the culture of Parsley is very simple, yet to have an abundant supply of it all the year round is often attended with some difficulty where spare lights are not available for this purpose, and especially in low-lying, moist situations. On cold, stiff, retentive soils it frequently dies off. It can be grown successfully in any light, rich ground that has a dry, porous subsoil. To meet a constant demand, three or four successive sowings should be made from February to May. The seed should be sown in very shallow drills, and be very lightly covered. When the young plants are up and large enough to handle, they should be thinned to 6 in. distance in the rows. The first sowing or two will furnish leaves through the summer and autumn, and with care and a little management through the winter; but sowings made in May for a supply in winter are preferable. A dry border should be chosen for it; and where there is a south wall a little sown at the foot of it will always be useful in spring. Before severe frosts set in ample provision should be made for thoroughly protecting a portion sufficiently large to furnish a supply of leaves during several weeks' frost. The coverings should only be put on in frosty weather, and in mild weather the plants should be exposed. The difficulty of having a supply during winter is experienced where there are no spare frames available. Many ways will, however, occur to an intelligent mind to meet these difficulties. Where the soil is unfavourable a site should be chosen in some sheltered part of the garden, and a bed should be prepared specially for it by putting a quantity of stone and brick rubbish at the bottom, and on this some soil suitable for the purpose. A sowing made on this towards the end of May, if carefully attended to during the summer months in thinning the plants and picking off any luxuriant leaves that may be produced, will furnish a supply during the winter, provided it has some protection from frost. A good way to preserve it is to take some flour-barrels, get a 2-in. auger and bore their sides with holes 1 ft. apart every way; put 6 in. of soil in the bottom of each barrel, then draw the roots of a good plant through the bottom holes, fill up with soil till the next holes are reached, draw in some more plants and so on until the barrel is full, then put four or five plants on the top; place the barrels in a cool house where they can get plenty of light. The produce, in both quantity and quality, will be such as will not disappoint any one who gives the method a trial; and such barrels are not unsightly. The plants should be good and strong for this purpose, or the produce will be small.

***Varieties.***—*There are several varieties, or rather selections,* Parsley in cultivation,—each grower having his own Double or Treble Curled to recommend; and doubtless great improvements have been made in its quality and appearance; but of really distinct kinds there are but few. The principal kind now in cultivation is the Dwarf Curled—a handsome variety, which grows close to the ground and does not readily run to seed. A variety called Carter's Fern-leaved is a very handsome kind, and much used for garnishing; but for general purposes the Dwarf Curled is perhaps on the whole the best. There are, moreover, the Napoleon or Celery-leaved Parsley, and the Hamburgh Parsley. The former is cultivated for its leaf-stalks, which are blanched and used in the same way as Celery; the latter is grown for the sake of its roots, which are eaten like Parsnips. Neither of the two varieties are, however, of much value, and therefore they are seldom found in gardens.

The Celery-leaved Parsley may be sown broadcast in an open border in April, and transplanted when the plants are 5 in. or 6 in. high into trenches, in the same manner as Celery, excepting that the trenches need not be so deep nor so wide apart,—2 ft. will be ample. The after treatment is exactly the same as that of Celery, only that it does not need quite so much moisture at the root. Hamburgh Parsley grows best in a deep, sandy soil, rather poor than otherwise. Sow in drills from March to May, thin to 1 ft. apart when the plants are large enough, dig it up in November, and house it in sand or dry earth, or protect it out of doors in the same way as Parsnips are preserved.

## Pennyroyal

(*Mentha Pulegium*).

This is a native of Britain, and succeeds best when transplanted every spring. It is used for the purpose of flavouring various dishes, puddings, etc.

## Peppermint

(*Mentha piperita*).

This is a native of Britain, and in some parts of England is largely grown for distillation. It may be propagated by seed or division, and requires in every respect the same treatment as the common Spear-mint.

## Purslane, Common and Golden

(*Portulaca oleracea et aurea*),

are annual plants, and are both natives of South America. The seeds are exceedingly small, consequently they should be sown in seed-pans under glass in light soil, and the seeds should be very slightly covered. As soon as the plants can be handled, they should be pricked thinly into other pans, and may finally be planted in beds in the open air about the middle of May. They will be found to succeed best in a somewhat dry, light soil. The leaves are used for various culinary purposes, and for salads, etc.

## Rue

(*Ruta graveolens*).

THE natural Order to which this plant belongs is the Rutaceæ. It is indigenous to the south of Europe, and is a hardy, low-growing evergreen shrub, which will flourish in any ordinary light soil. It is easily propagated by cuttings, which may be inserted under hand-glasses or in pots or pans in a close frame, either during the autumn or in spring; and the cuttings, when rooted, should be planted out in a bed in lines, at a distance of 1 ft. or 18 in. from plant to plant. The leaves have a strong and somewhat unpleasant smell, and are exceedingly bitter. The plant was formerly held in considerable esteem on account of its supposed medicinal virtues; and an infusion of the leaves and young shoots at the present day is frequently given to children, as well as to adults, as a remedy for stomach disorders, etc. Poultry fanciers also consider that the leaves and young shoots, when chopped into small portions and mixed with the soft food given to valuable birds, are of considerable importance in keeping them in a healthy condition.

## Rosemary

(*Rosmarinus officinalis*).

THIS plant is to be found in most European gardens. It is largely grown in France and Germany, where it is used in the manufacture of Eau-de-Cologne and other scents. It is also used in preparations for the growth of the hair, for which purpose it is said to be an important ingredient. Rosemary being a hardy evergreen shrub, it may be planted in almost any part of the grounds: indeed, there are several variegated kinds that are very ornamental, but are somewhat tender compared with the old Green-leaved variety. All the kinds are easily propagated by slips or cuttings in the spring. Cuttings should consist of young growths 3 in. or 4 in. long, placed in sandy soil in a warm house or pit; but slips torn from the old plant with a heel attached will root readily in sandy soil in any shady situation out of doors. Occasional pruning is necessary, in order to keep the plants from assuming a straggling habit.

## Sage

(*Salvia officinalis*).

THIS is a native of the south of Europe, and is always an inmate of the herb garden. It is very vigorous, and will grow anywhere; but we have seen it perish on the London clay, and it, of course, does best on a warm and well-drained soil. As it is apt to get too straggling when kept too long in one spot without being transplanted, the best way is to replant every third or fourth year; and should the plants ever be cut off in winter, a tuft on some dry bank would most probably survive and furnish any amount of cuttings. Where but a small supply is required, a tuft or two on the margin of a clump of shrubs would suffice. The slips may be readily struck in a shady border under a hand-light, or on an old or gentle hotbed. It may also be freely raised from seed; but that means is not often resorted to, as cuttings strike readily, and are more quickly raised than seedlings. There are several varieties—the red, green, narrow-leaved green or Sage of Virtue, and broad-leaved green or Balsam Sage. The leaves of these varieties present several shades of colour, and there is also a handsome variegated form, cultivated for ornament only. It is a good practice every April to peg down and layer the outside and lowest branches, and thus always have a stock of young plants in hand for planting the next and every succeeding April. Often the severe frost will kill the centre of the old plants, while the young layers will generally be safe and sound, and the whole of those plants not layered very often killed.

## Summer Savory

(*Satureja hortensis*).

THIS is a native of Italy, and an annual which may be sown at once in the bed in which it is to grow, about the middle of April; and the plants, when large enough, should be thinned out to a distance of 6 in. or 8 in. from each other; or it may be sown under glass, and receive in all respects similar treatment to that recommended for Sweet Marjoram; and, when in flower, it should be cut and dried in the same way.

## Winter Savory

(*Satureja montana*).

THIS is also a native of the south of Europe, but it is a hardy perennial, and can be readily increased by means of division or cuttings. It is used for similar purposes to the former, generally in a green state for soups, salads, etc. Both varieties have long been held in considerable estimation for culinary purposes.

## Tansy

(*Tanacetum vulgare*).

THIS plant is a native of Britain, though seldom used and comparatively little known. There are two varieties—one having plain leaves, those of the other being curled; and these are generally preferred to the plain leaves.

The young leaves are used in cookery for flavouring and colouring pastry, etc. Plants may be raised from seed sown in a light soil in spring and afterwards transplanted; or plants may be increased more readily by dividing the old stools.

This operation should be done any time in autumn or spring,—the former being preferable. In order to promote free young growth, which is essential to the production of nice young leaves, the plants should occasionally be cut back, and have a dressing of rotten manure applied to the roots; or during dry weather frequent soakings of manure-water will be beneficial to them. Fresh plantations should be made every few years, as the leaves produced by old plants become small after a longer period.

## Tarragon

(*Artemisia Dracunculus*).

THIS, a native of Siberia, is a very near ally of the Wormwood and Southernwood, though somewhat different in aspect, and very different in odour. It is an important old plant, and not at all difficult to grow. It is a hardy herbaceous perennial, but by no means so vigorous on some soils as its relatives before named. It is vigorous and healthy on a light, warm soil, or one with thorough drainage, and slow-growing and almost delicate on stiff, clayey ones. It occasionally perishes from severe cold, and probably oftener from too much wet at the root. If we wished to preserve a few stools of it for a long time, we should put it on a slightly raised border under a south wall; but as in ordinary cultivation such expedients are not resorted to, it is better to give it a well-drained spot in the herb ground, and make a fresh plantation every year, or every second year. It is often surprising to see what a good effect raising the earth from 6 in. to 1 ft. above the level of the spot has upon many things that happen to be a little tender in this climate. We have no doubt that by raising the soil thus, by the aid of a few burs or stones, Tarragon would do far better on cold, wet soils, where on the ordinary level it is rather delicate. When just coming into bloom is the best time for picking it for placing in vinegar or making Tarragon vinegar, and it should be gathered when quite dry, as also for drying for winter use; but young Tarragon can be obtained most months of the year by pulling the young shoots in April when about 3 in. above ground, with an inch or two of underground shoot or root to them, and planting them 3 in. apart in boxes, pans, or garden pots, and standing them in the shade all the summer. The pots, etc., will get full of roots by autumn, and be in readiness to place in a little heat in succession all the following winter and early spring months; and whilst young and crisp it is in much request in many families. A succession of young fresh shoots is always obtainable out of doors by methodically cutting it daily for use, or, if not, cutting part of the bed once a fortnight. Tarragon always does best on a sweet, healthy, pulverised soil; and planted in April, by pulling the young shoots with a bit of underground root as above described, and dibbling them in 1 ft. apart each way, the ground will get filled by autumn, when the stems should be cut off when ripe and decaying on the approach of frost. The beds should then be dressed with old decayed Mushroom manure, light, decaying, old hotbed linings, or half-decayed leaf-mould, about 2 in. deep, in order to secure it from the winter frost; when not thus attended to, I have seen it entirely killed, or very much weakened, by severe frost. By having a spot planted in various aspects it may be procured in succession, and very good and young, a great part of the seas

A hand-glass placed over some on a south border in the early part of the year will start it into early growth. It is liable to canker on wet, cold, shaded ground, and to be attacked by mildew both at root and branch on shallow, hot soils.

## Thyme

*(Thymus vulgaris).*

This is indigenous to Europe, and is perfectly hardy. It succeeds best in a light, rich soil, and may be increased by dividing the old plants in spring, from cuttings, and from seeds. If seeds be preferred, they may be sown in pots or pans about the end of March, and, when the plants are large enough to handle, they should be pricked out into pans or boxes, gradually hardened off, and finally planted in beds early in May. Thyme is used in various ways, but chiefly for stuffings. Lemon Thyme may be propagated and grown in the same way as the common kind, and this variety is sometimes cut and dried for winter use.

## Wormwood

*(Artemisia).*

The Common and Sea Wormwood are natives of Britain, and are cultivated for their leaves, which are used in medicine, and for poultry. This is probably the bitterest of all plants. Many people make it into tea and use it as a tonic. There is a variety called Roman Wormwood that is not so distasteful to the palate as other kinds,—hence it is the kind generally grown. All the varieties are readily increased by seed sown in the spring, or by division of the roots—the latter plan being the best and most easily accomplished. Cuttings may also be struck in sandy soil, in a shady situation. The plants may be cut down every year as soon as they show bloom, and the tops hung up in a dry shed for winter use.

## Herb Culture in Market Gardens.

The chief supplies of herbs for London come from Mitcham, which has long been celebrated for its herb fields, and from which the London herbalists derive their Mint, Sage, Liquorice, and similar herbs. Of these, as a rule, distillations are made by the growers, and they are disposed of in a semi-refined condition, or the herbs themselves are brought into market as soon as they are harvested.

**Chamomile.**—To this several acres are devoted—the double-flowered kind being preferred, on account of the weight of the produce; but both single and double sorts are grown. In March, old and somewhat "spent" plantations are broken up and the plants divided into good-rooted slips, which are planted in well-prepared ground, in rows 2½ ft. apart, and 2 ft. asunder in the rows. A common practice, however, is to plant as thick again as this, and to thin out the plants afterwards to the distances just named. The plantations are intercropped with Lettuces in spring. As soon as the blooms begin to expand, they are fit for gathering; and from that time, as long as they yield sufficiently to pay, the flowers are gathered several times in a season by women, who are either paid a regular day's wages, or a penny, or thereabouts, per pound for picking.

**Lavender.**—This is extensively cultivated at Mitcham, both farmers and cottagers bestowing special attention on it; and this district presents a lovely sight in the last fortnight of July, when the different fields of it are in full bloom, the air for miles around being loaded with its fragrance. Lavender is increased by means of rooted slips, planted out in rows about 18 in. apart and half that distance asunder, in March or April. Sometimes the sets are planted as wide in the row as the drills are apart. For the first year the produce amounts to but little; and therefore Parsley or Lettuce is planted between the rows. As soon as the plants have grown sufficiently to become crowded, every alternate row, and also every alternate plant in the rows left, are lifted—say in spring—and transplanted into another field, so as to form a new plantation. Thus the plants stand 3 ft. apart each way, or 3 ft. one way and 18 in. the other. Coleworts, Lettuces, or other early and quickly matured crops, are raised amongst the Lavender in the early part of the year; but, after June, all such catch-crops are removed. The flowers are usually harvested in the first fortnight of August, and, as has been stated, are distilled at the farm on which they are grown.

**Liquorice.**—This was once largely grown at Mitcham; but, although it is still grown in considerable quantities, it is not now so extensively cultivated there as formerly, on account of the cost attending its culture. It entirely occupies the ground for three years, and during that time requires great attention in the way of cleaning, besides the ultimate cost of trenching out the roots, or rather, underground stems. The ground being deep, is heavily manured in autumn or winter, when it is trenched and laid up in ridges, in a rough state, till spring. It is then levelled, marked off in drills about 2 ft. or 3 ft. apart, and some 3 in. or 4 in. deep, and in these the sets are planted in March. The sets consist of finger-length pieces of the old root-stems, each containing an eye or two. During the first year the ground is usually intercropped, as is also the case in the earlier portion of the second year; but after the middle of the second summer, and throughout the whole of the third year, the Liquorice requires all the room. When the stems are matured in the autumn of each year, they are cut over close to the ground; and if time can then be spared, the soil between the rows is forked over, some well-decayed manure being occasionally worked into it at the same time. The lifting of the crop, which usually takes place in the end of the third season, is a difficult operation, involving much labour. A deep trench is cast out, lengthways, alongside the first row, and by means of forks, pulling ropes being even sometimes employed, the root-stems are extracted. In this manner the whole of the rows are treated, until all are successively lifted. The roots may then be stored in sand or pits, like Beets, Carrots, or Potatoes. Growers of Liquorice do not always harvest the crop; on the contrary, they sometimes sell it as it stands in the field, and the purchaser lifts it himself.

**Mint.**—Both Spearmint and Peppermint are largely grown at Mitcham, particularly the latter; indeed, this crop ranks second in importance only to Lavender. It is first planted in rows 13 in. apart each way, and in the end of the next two seasons it is ploughed in. The plantations are kept free from weeds during the summer by means of hoes; and about the end of the first week or during the second week of August is the usual time for cutting Mint for distillation. In the Fulham Fields, and in other districts in which market-gardening is carried on, Mint is largely grown for sale in a green state. For this purpose the dampest piece of ground is selected for its culture, if it is to be a permanent plantation; but it will grow in almost any soil. It is planted in rows 1 ft. apart, and the ground is intercropped the first year; but afterwards it runs through the soil in such a way that it becomes a complete mass of undergrown stems and roots. It is cut and bunched for market as required, the greatest demand for it being during the Pea season. It is also forced in large quantities. Sometimes whole ranges of frames are filled with Mint alone. These beds are made up in December or January, when the ground they occupy is excavated to a depth of 20 in., and filled in with fermenting manure packed firmly. A few inches deep of soil is then added, and in this the Mint roots are thickly planted. Linings of manure are also placed round the frames, the sashes during the night and in cold days being also covered with it.

**Poppies.**—Of the white kind several acres are grown. They are sown in rows in spring, some 20 in. or 24 in. apart, and require no further care, beyond a little thinning and cleaning, till August, when their seeds ripen.

**Sage.**—This forms an important crop, which, under favourable circumstances, is pretty remunerative; the stalks being cut over, bunched, and sent to market at once. New plantations are formed with rooted slips, obtained by dividing the old plants; they are inserted, late in spring, in rows 1 ft. or 2 ft. apart, and about 1 ft. asunder in the rows. During the first season Parsley or Lettuce forms an intercrop, which also occupies the ground during the earlier part of the succeeding ones. Except hoeing and cleaning, the plantations need no care so long as they continue in a thriving condition; and, when the lines get broken, and blanks and sickly plants occur, the plantation is broken up. Both the reddish and green-leaved kinds are cultivated.

**Squirting Cucumbers.**—These are raised in frames, like Vegetable Marrows, and are planted out, about the end of May, in rows some 4 ft. or 6 ft. apart, and 4 ft. asunder in the row. They flower and fruit at the same time, and the fruits are gathered before they are ripe, otherwise a mere touch would burst them. The fruits are usually distilled by the growers.

## Drying and General Treatment.

In drying herbs, care should be taken to see that the leaves and stalks are not shrivelled up in such a manner that they afterwards crumple up between the fingers. They should, for these reasons, be cut in dry weather and dried in the shade. A day or two will be sufficient to fit them for tying up into small bundles and hanging up in the store-room, where the drying process will be completed. In a damp store-room they are apt to get mouldy and useless; it is therefore necessary to see that the place is perfectly dry. The general treatment of the plants during the growing season consists in simply keeping the ground stirred and clean and free from weeds.

# MONTHLY CALENDAR OF OPERATIONS.

## January.

If frosty weather should set in, take care to have all salad, and other kinds of vegetables required for use, protected so as to be readily got at. Trench, ridge, or dig all vacant ground, leaving the surface as rough as possible. Wheel manure during dry weather, and stir amongst crops with the hoe. Prepare Bean and Pea sticks, to be ready for use when wanted. Make out seed-lists, so as to give the nurserymen time to get up the orders in a proper manner before the busy season arrives, and maintain neatness and order everywhere. Make labels and sharpen tools during bad weather, and endeavour to forward the work as much as possible before the fine weather arrives.

**Artichokes, Jerusalem.**—These may be planted towards the end of the month if the soil be in a workable condition. Dig up and house in sand all those left in the ground.

**Asparagus.**—Continue to take up for forcing, and keep linings constantly turned and renewed round permanent beds that are being forced.

**Basil.**—Sow in pots or boxes placed in heat, where Basil is required in a green state early in the spring.

**Beans, Broad.**—Make sowing of Early Mazagan or Long-pod in open border, also in pots in cold frame or pit, for transplanting next month.

**Beans, French.**—Sow for succession.

**Brussels Sprouts.**—Make a sowing in boxes or pans, placed in a pit or frame where a slight warmth is maintained, and harden off as the plants progress.

**Carrots.**—Sow on hotbeds for succession; look over those stored away, and if showing symptoms of vegetation, pull down the pile and rebuild.

**Celery.**—Sow a pan in heat, for early work. Any good dwarf white variety.

**Chervil.**—Sow in pots or boxes, and place them in gentle heat, for early supply.

**Chicory.**—Sow on a gentle hotbed for small salad, and take up old roots for forcing in the Mushroom house.

***Corn Salad.***—*Make* a sowing in a cold frame, to give a supply after *other crops* are run to seed.

**Dandelion.**—Take up for forcing.

**Endive.**—A sowing may now be made on a hotbed, if Endive be in request early in spring.

**Fennel.**—Take up roots and pot them, for early supply. Place them in a house or pit where a moderate heat is kept up.

**Mint.**—Plant roots in pots or boxes, and place them in gentle heat.

**Mushrooms.**—Collect material for succession beds, and keep it in a dry place. Maintain a temperature of 60° to 65° where beds have been spawned. Make new beds in succession.

**Mustard and Cress.**—Sow in heat.

**Onions.**—Transplant autumn-sown plants if the weather be favourable. Sow in pots or boxes placed in heat.

**Onions, Underground.**—Plant this month, if the soil be in working order.

**Peas.**—Sow early varieties in turves or boxes placed in gentle heat; and a sowing may also be made out of doors in a warm border.

**Radish.**—Make frequent sowings amongst Potatoes, Carrots, etc., in frames on gentle hotbeds.

**Rape.**—Sow in heat.

**Rhubarb.**—Take up roots for forcing.

**Seakale.**—Force in succession.

**Sorrel.**—Force in succession. A sowing may be made on a hotbed, for early spring use.

**Tomatoes.**—Sow for succession; pot off those sown last month.

**Witloof.**—Force and blanch in succession.

## February.

DIG all spare ground not already done, whenever a fine day can be taken advantage of. Keep the surface of the ground stirred between all growing crops, and protect any plants liable to be cut with frosts, which this month usually occur in the evenings and early mornings. Maintain cleanliness and order everywhere, and forward the work as much as possible before the busy season, which will now soon arrive.

**Angelica.**—Autumn-sown plants should now be put out into rows 2 ft. to 2½ ft. apart, in rich moist soil.

**Artichoke, Globe.**—Loosen the covering material round the collars of the plants.

**Artichoke, Jerusalem.**—Make final plantation this month, choosing the soundest and medium-sized bulbs for the purpose.

**Basil.**—Pot off plants that were sown last month, placing two or three round the side of a 5-in. or 6-in. pot; keep well supplied with water and close up to the glass. Pinch out tops of shoots when again established.

**Beans, Broad.**—Sow in pots placed in heat, for transplanting next month—*i.e.*, where this mode of culture is adopted. Make *successional* sowing of Long-pod in open border.

**Beans, French.**—Sow in heat for succession.

**Borage.**—Sow in pans placed in heat when an early supply is needed.

**Brussels Sprouts.**—Prick off those sown last month into boxes or beds in a cool frame, keeping them close up to the glass.

**Carrot.**—Make last sowing on hotbeds.

**Celery.**—Make small sowing of an early white variety. Prick off those from last month's sowing. Keep them close to the glass in a moist, warm temperature; give abundance of air on fine days.

**Chervil.**—Sow in warm situations towards the latter end of the month. Thin out plants sown in heat last month, and transplant some into boxes placed in a cold frame, to give a supply before it can be obtained from the outdoor sowings.

**Cucumbers.**—Give frequent top-dressings as the roots appear on the surface; and as the days lengthen the temperature of the house may be slightly increased. Sowings may now be made for planting out in frames on hotbeds, etc.

**Dandelion.**—Cover over with soil or sand, to a depth of 3 in. or 4 in., in order to blanch the tops, as required in succession.

**Egg Plant.**—Sow in pots or pans in heat; pot off when large enough to handle.

**Endive.**—Plants raised on hotbeds last month, as soon as fit to handle, should be carefully transplanted in other frames where a gentle bottom heat can be given them. Other sowings may be made in the same way as the last.

**Garlic.**—Plant any time this month in any ordinary garden soil.

**Horseradish.**—New plantations should now be made on well prepared soil.

**Leeks.**—Make small sowing on warm border.

**Lettuce.**—Sow on gentle hotbed, or in boxes or pans placed in gentle heat. Harden off when the plants are up.

**Mint.**—Take up for successional forcing.

**Mushrooms.**—Spawn beds when the heat has declined to 75°. Guard against damp, and sudden checks in the temperature, by covering up recently spawned beds with mats or dry straw or hay.

**Mustard and Cress.**—Sow each week in heat for succession.

**Onions.**—Transplant those sown in the autumn, if not already done.

**Onions, Underground.**—Plant, if not already done.

**Parsley.**—A sowing should now be made on a warm sunny border.

**Peas.**—A successional sowing of early kinds may be made.

**Rhubarb.**—Force. Make sowings on warm borders, where young plants are required. Make fresh plantations by dividing old stools, or from last year's seedlings.

**Seakale.**—Force in succession.

**Shallot.**—The main plantation may now be made.

**Spinach.**—Make a small sowing of Round Spinach towards the end of the month, on a warm well-sheltered border.

**Tomatoes.**—Sow for succession, shift on such as require it, keep close *to the glass*, and stop the shoots when in bloom.

***Turnips.***—*Sow* in temporary frames, for early supply.

## March.

This is perhaps the busiest month of the year in the kitchen garden, and one on which the year's success, or otherwise, to a great extent depends; for if matters having reference to cropping be not systematically performed in proper time, when the soil is in the right condition to receive the plants or seeds, little else but failure need be expected. In matters of cropping, do not adhere to any certain rule as to the day of sowing or planting, whether the soil and weather are suitable or not; but first make a good and kindly preparation, by thorough deep culture and turning over of the soil in as rough and open a manner as possible, to admit sun and air. In short, turn and re-turn the soil till it falls to pieces like slaked lime, and is in every way so sweetened and pulverised that, by watching the opportunity for a fine day, a large portion of work may be performed. Having all things in order and in good condition is the very keystone of success. It is even better to be a little out of season than to begin cropping in the midst of disorder.

**Angelica.**—Sow in warm situation at the beginning of this month, and thin out the plants as they proceed in growth, finally leaving them 2 ft. or 2½ ft. apart. Cut out flower-stalks from autumn-sown plants as soon as they show themselves.

**Artichokes, Globe.**—Remove all covering from the plants, trim off decayed leaves, and fork in a good dressing of manure between the rows. Cut down a few plants to produce suckers for planting.

**Asparagus.**—Sowings may now be made in drills 1 ft. apart, in light, rich soil. Transplant from sowings made a year ago into their permanent positions. Rake off loose litter from permanent beds, and gently fork over the surface, choosing dry weather for the operation. This should be done before the buds begin to push. Hand-lights or cloches may be placed over a portion of the outdoor beds, with a view to forwarding them, to give a supply between the last forced "grass" and that growing out of doors.

**Balm.**—Divide old roots and make fresh plantation.

**Beans, Broad.**—Plant out early in this month such plants as have been raised in cold frames or in heat, taking care to have them previously well hardened off. Make successional sowings of Long-pod or Broad Windsor in open quarters.

**Beans, French.**—A sowing may now be made for transplanting into cold pits and frames; and in the early part of the month a sowing may be made in frames, on hotbeds, for early supply.

**Borage.**—Make sowing early in the month in pots or pans in a warm temperature, to provide plants for transplanting into the open ground next month; and make general sowing in open border, towards the end of the month.

**Broccoli.**—In the last week of this month a general sowing may be made, in a light open situation.

**Brussels Sprouts.**—Make small sowings out of doors early in the month. Plant out such as have been growing in frames towards the end of the month, choosing warm showery weather for the operation.

**Burnet.**—Divide old roots and make new plantations.

**Cardoon.**—Sow in small pots in heat for early work.

**Carrot.**—Sow Early Horn on warm borders.

**Cauliflower.**—Plant under hand-lights or in temporary frames 12 in. to 18 in. apart. Make sowing in boxes placed in gentle heat, for autumn supply.

**Celery.**—Make sowing in gentle heat for planting in trenches early in June.

**Chickpea.**—A sowing may now be made, in a similar manner to the ordinary garden Pea.

**Chicory.**—Take up for forcing as required.

**Chives.**—Divide old roots and make new plantations.

**Cucumbers.**—Make plantations on hotbeds, from seed sown last month. Keep the frame close after planting, and cover up at night.

**Dandelion.**—Sow in drills in open border towards the end of the month.

**Endive.**—Keep the lights covered up where Endive that has been grown in heat is large enough for blanching. Another sowing on a hotbed may be made this month.

**Fennel.**—Seed may now be sown, or old plants may be divided and new plantations made therewith.

**Horseradish.**—New plantations may still be made, if not already done; but the earlier it is completed in this month the better.

**Leeks.**—Sow for succession.

**Lentil.**—Sow in drills 12 in. or 15 in. apart.

**Lettuce.**—Transplant from autumn-sown seed-bed into light, airy situations.

**Mint.**—Make new beds by division of the old roots.

**Mushrooms.**—A more humid atmosphere and slightly higher temperature may now be maintained.

**Mustard and Cress.**—Sow for succession.

**Nasturtium.**—Sow in drills at the end of the month.

**Onions.**—Sow main crop any time this month, if the weather will permit.

**Parsley.**—A successional sowing may now be made.

**Parsnips.**—Towards the middle of the month, if the ground and weather be in a favourable state, this crop may be sown.

**Peas.**—Plant out those raised in heat, choosing a dry day for the operation. Make first main sowing in open quarters.

**Pennyroyal.**—Divide old stools and make new plantations.

**Peppermint.**—Divide roots and transplant.

**Purslane.**—Sow in seed-pans, placed in gentle heat, close to the glass.

***Radish.***—*Sow* in frames, or on warm borders, for succession.

***Rape.***—*Sow* under glass for succession.

**Rhubarb.**—Forward a few roots out of doors by applying heating material round them.

**Rosemary.**—Propagate by cuttings placed in heat, or by slips inserted in sandy loam in a shady corner.

**Rue.**—Cuttings may now be taken off and inserted under a hand-light in sandy loam.

**Salsafy.**—Sow towards the end of the month.

**Savory, Winter.**—Propagate by division or cuttings, and make new plantations.

**Seakale.**—Sow, and procure young plants by means of root cuttings. Force in succession.

**Spinach.**—Sow the round variety.

**Shallots.**—If not already done, the main crop should at once be planted. Seed may also now be sown.

**Sorrel.**—Sow in drills or broadcast.

**Tansy.**—Sow any time during the month.

**Thyme.**—Sow in pans or shallow boxes placed in a very gentle heat.

**Tomatoes.**—Sow for growing on in cold frames during the summer.

**Turnips.**—Sow in a warm, sheltered border.

**Wormwood.**—Sow, and make new plantations by division of the old roots.

## April.

AN excellent rule to be kept in mind in reference to the kitchen garden is, to sow little, often, and thin. Thin out and otherwise attend to all growing crops. Trench every bit of ground as soon as it becomes vacant, casting it up rough and in ridges with a strong steel fork. Where necessary, give it a good dressing with manure or other compost, thoroughly incorporating it with the soil as the trenching progresses. During mild showery weather slugs are sure to be troublesome, devouring, as they do, young vegetables, especially those in seed-beds. To prevent their ravages, sprinkle with fresh air-slaked lime. At this season saw-flies deposit their eggs on the young leaves of Gooseberries and Currants, and by-and-by the caterpillars from these prove destructive to the crop. They may be effectually got rid of by immediately applying a thick dusting of air-slaked lime, dry soot, and dry wood-ashes, on a mild morning when the bushes are moist with dew, or after rain; or failing the occurrence of moisture naturally, they may be damped with the garden engine or syringe. In this way not only insects' eggs, but also Moss and Lichen, may be got rid of, and a healthy, robust, dark green appearance given to the bushes and clean stems. Previous to the last ten days or fortnight, the weather has been favourable for cropping and seed-sowing, and now that "bright days have come again" these operations may be proceeded with. Should gaps appear amongst vegetable crops, they should be filled up from parts that are thickest, carefully preserving the roots and lifting with good balls, with a trowel in each hand. Every kind of crop may be successfully transplanted when in a young state by using hand trowels: even tap-rooted plants, such as

Carrots, Parsnips, Beets, Parsley, etc., will withstand moving in this way whilst young; while pulling or taking up young plants, and dibbling them in with naked roots, will be found to be attended with little success. As soon as young crops appear above ground, run a light hand scarifier or an open-toothed rake across the drills, to loosen and break the surface; and as soon as the rows can be distinguished run a narrow Dutch hoe between them, so as to keep down weeds and maintain an open, healthy surface. Crops of all kinds should be thinned as soon as they can be handled, so as to prevent overcrowding.

**Aniseed.**—Sow in pots or pans placed in gentle heat.

**Artichoke, Globe.**—Make plantation of offsets taken from old stools at the beginning of the month.

**Asparagus.**—Make plantations from 1-year-old seed-beds, if not already done.

**Basil.**—Sow in gentle heat, for transplanting in June.

**Beans, Broad.**—Make main sowing of Broad Windsor or Long-pod, and earth up those that are a few inches above ground.

**Beans, French.**—Make a small sowing in the early part of this month in some warm corner, or in a pit or frame, or under hand-lights, for transplanting next month. Make sowing out of doors towards the end of the month. Early in the month transplant into pit or frames such plants as were raised last month for the purpose. Beware of red spider on indoor crops.

**Beet-root.**—In warm localities this crop may be sown towards the end of the month.

**Borage.**—Transplant those plants raised in heat for the purpose, they being previously hardened off. Make successional sowing out of doors.

**Borecole.**—Sow any time this month.

**Broccoli.**—If not already done, the main sowing should be made as early in this month as circumstances will permit.

**Brussels Sprouts.**—Make main sowing this month, on well prepared ground.

**Burnet.**—Make sowing out of doors in shallow drills, choosing a warm situation where the soil is light and sandy.

**Capsicum.**—Sow on gentle hotbed, or in pots or pans placed in a genial temperature. If done early in the month the chances of success will be greater.

**Carrot.**—Make main sowing in early part of this month.

**Cauliflower.**—Plant in open borders, as early in the month as circumstances will permit. Prick out those sown in heat last month, harden off towards the end of the month, and plant in a warm border.

**Celery.**—Plant in frames, from sowings made in January and *February*. Frames recently cleared of Early Potatoes or *Asparagus* will answer well for this purpose. Make sowing under hand-lights or in cold frames, for main autumn supply.

Prick off into boxes or into beds in frames plants raised in heat last month, give plenty of air and water, and keep the soil constantly stirred between them.

**amomile.**—Divide old roots and make new plantations. Shade from sun, and keep well watered until the roots have taken hold of the soil.

**ervil.**—Sow for succession, and thin out plants of earlier sowings.

**icory.**—Place inverted pots over roots in the open ground, and make sowing in open border to supply next year's roots.

**cumbers.**—Make sowings for planting in pits and frames and on hotbeds.

**andelion.**—Thin out plants from last month's sowing, leaving them 6 in. or 8 in. apart. Sowings may still be made.

**ill.**—Sow in any spare corner.

**gg Plant.**—Shift on as the plants progress, and expose them freely to light and sun. Keep them in a warm house, or plant them out into a hotbed in the same way as Cucumbers.

**ourds.**—Sow in pots in frames, for transplanting in May and June.

**orehound.**—Sow broadcast or in shallow drills. Take off cuttings from old plants, and insert them in sandy soil in a shady situation; or the old stools may be divided and new plantations made therewith.

**yssop.**—New plantations may now be made by dividing the old roots, by cuttings, or by sowing seed in any spare corner.

**avender.**—Slips may be torn off the old plants with a good heel, and inserted firmly in sandy soil in a partially shaded situation

**eeks.**—Make main sowing in drills.

**entil.**—Sow as recommended last month.

**ettuce.**—Plant out such as have been raised in heat and hardened off.

**arjoram.**—Sow in warm situation, towards the end of the month. Plant out such as have been raised in heat and hardened off.

**int.**—Make new beds.

**ushroom.**—Cow-manure should now be got together for making spawn, before the cows are given any green food.

**asturtium.**—Sow and thin out plants, when they are up, to a distance of 12 in. to 18 in. apart.

**nions.**—Thin out when large enough. Top-dress autumn-sown or transplanted beds. Early in the month transplant those raised in heat.

**arsley, Celery-leaved.**—Sow in open border.

**arsnip.**—This crop should be at once sown, if not already done.

**eas.**—Make principal summer sowing of several varieties that will succeed each other in coming into use.

**urslane.**—Prick out plants from seed sown last month into pans or boxes, placed in a cool frame.

**adish.**—Keep up a succession by weekly sowings on warm moist soil.

**ampion.**—A small sowing may be made this month in a warm situation.

**Rape.**—Make frequent sowings on warm borders.
**Rosemary.**—Transplant cuttings struck last month.
**Rue.**—Make fresh plantations with cuttings struck last month.
**Sage.**—Peg down some of the lowest branches of old-established plants, or take off slips or cuttings and place them in a shady border, in sandy soil, in order to procure a stock of young plants. Seed may also now be sown, if this mode of propagation is preferred.
**Salsafy.**—Make main sowing, if not already done.
**Savory, Summer.**—Sow in beds where the plants are to remain, and thin out, when large enough to handle, to a distance of 6 in. or 8 in. apart.
**Scorzonera.**—Make main sowing.
**Skirret.**—Sow early in the month.
**Spinach.**—Sow for succession, of the round variety.
**Tansy.**—Transplant, from last month's sowing, as soon as the plants are large enough. Old stools may be divided and replanted.
**Tarragon.**—Divide a few old stools, when they have made shoots 2 in. or 3 in. long, into small pieces, and place them in pots, pans, or boxes, to be grown on through the summer in a shady situation, and give a supply during winter. Make new plantations by dividing old roots in a similar manner, and pricking out the small shoots into good rich soil 1 ft. apart each way.
**Thyme.**—Prick out into boxes, placed in a warm frame or pit, plants that were sown last month, as soon as they are large enough to handle. Insert cuttings in sandy loam under a hand-light; divide old roots and make new plantations.
**Tomatoes.**—Sow in heat for outdoor cultivation, also for growing on in pots under glass. Keep plants in fruit well supplied with manure-water, and keep closely stopped all superfluous growths.
**Turnips.**—Make sowing in open quarters.

## May.

HOEING between rows, should the weather be favourable, is the operation that must take precedence of all others at this time; and all seedlings, without an exception, are sure to be accompanied by weeds in great profusion—which, unless destroyed at once, will soon injure and spoil the appearance of the crops. Potatoes, too, require earthing up, to protect them from frost. Broad Beans will also require earthing up, and the earliest will soon be ready for topping. All tender crops just making their appearance above ground must have the soil drawn over them, to shield them from frost. Unctuous, stiff, wet soils must be methodically trenched, exposing as much of them as possible to the influence of sun and air, in a rough ridged state. Forking, scarifying, hoeing, and *otherwise* loosening the soil amongst crops, is the main point in *good cultivation,* giving neither vermin nor weeds a chance of *istence.* Make up vacancies by transplanting, or you tolerate a loss; everything can be transplanted by means of a trowel in each hand—one to open the hole and the other to take up the plant with a ball of earth attached to it.

**Angelica.**—Cut down stalks from autumn-sown plants intended for candying towards the end of the month, unless the plants have made little progress, in which case they may be left a fortnight or three weeks longer.

**Aniseed.**—Plant out in light rich soil rather thickly, from sowing made last month.

**Artichoke, Globe.**—Towards the end of the month make plantation for autumn supply. Plant three offsets in an angular position 6 in. or 8 in. apart, each set of plants being 3 ft. or 4 ft. apart each way. Shade and water until the roots have taken hold.

**Asparagus.**—Keep beds containing seedlings scrupulously clear of weeds, as this will greatly add to the growth of the plants.

**Basil.**—Pot off plants sown last month singly into small pots, or two or three in larger pots; keep close the glass, and harden off by degrees, as the plants become established.

**Beans, Broad.**—A sowing for autumn use may now be made. Give support to those requiring it. Keep the ground between the rows clear of weeds by the frequent use of the hoe.

**Beans, French.**—Make principal sowing in open quarters, earth up early crops, and keep the ground well stirred between them.

**Beans, Scarlet Runners.**—Sow in heat early in this month for transplanting, and in warm open border towards the middle of the month.

**Beet-root.**—The main crop should now be sown, if not already done.

**Borecole or Kale.**—Prick out seedlings that are large enough to handle.

**Broccoli.**—Towards the end of the month Broccoli plants may, if large enough, be pricked out from seed-bed in narrow borders, planting them from 6 in. to 9 in. apart each way.

**Brussels Sprouts.**—Make a small sowing for succession; transplant such as are large enough into narrow beds.

**Burnet.**—Thin out plants from sowing made last month, leaving them from 5 in. to 6 in. apart.

**Capsicums.**—Pot off from last month's sowing. Keep close the glass, and apply frequent syringings overhead, to guard against red spider.

**Cardoons.**—Sow in trenches in open ground; harden off those raised in heat, and transplant, if the weather be favourable, towards the end of the month.

**Cauliflowers.**—Protect those turning in by breaking the leaves over their heads.

**Celery.**—Make main sowing of late sorts for winter and spring use. The seed may either be sown under a wall on a warm border, or in a cold pit or frame. Keep the roots of all Celery plants in a moist condition.

**Cucumbers.**—Sow for succession.

**Endive.**—A small sowing may be made towards the end of the month.

**Gherkins.**—Sow in pots or in frames, for transplanting out of doors next month.

**Gourds and Vegetable Marrows.**—Seeds may be sown where the plants are to remain, and those plants that have been raised in frames may now be planted out, protecting them with hand-lights or some other contrivance until the roots get hold of the soil. Sowing may still be made in pots for transplanting.

**Leeks.**—Make last sowing where they are to remain, for winter and spring use.

**Lettuce.**—Sow in drills in open situations, and thin out the plants to 9 in. or 12 in. apart, when large enough to handle.

**Marjoram.**—Sow in boxes or pans placed in gentle heat, prick off when the plants are large enough to handle, keep close the glass, and harden off ready to plant out next month in the open ground.

**Mushroom.**—Make beds in open sheds, and in the open air.

**Mustard and Cress.**—Sow under wall in warm situation each week.

**Oxalis.**—Towards the end of the month tubers may be planted, in the same manner as Potatoes, only that they may be planted more closely together.

**Parsley.**—Make a good sowing this month for autumn and winter supply.

**Parsley, Celery-leaved.**—Prick out plants from last month's sowing.

**Parsnips.**—Thin out to 9 in. apart as soon as large enough to handle.

**Peas.**—Make main sowing for late summer and autumn supply.

**Purslane.**—Plants that have been raised under glass may now be finally planted out in open borders.

**Radish.**—Select good roots from spring sowings, and plant in rich soil, for producing pods for seed or pickling.

**Rampion.**—Main sowings may now be made.

**Sorrel.**—Sow for succession.

**Spinach.**—The Flanders or Lettuce-leaved kinds may now be sown at intervals of a fortnight or three weeks.

**Thyme.**—Plant out into their final quarters such plants as have been raised in heat and gradually hardened off, and also plants struck from cuttings last month.

**Tomatoes.**—Harden off plants that have been raised in heat, and plant out into a warm situation towards the end of the month.

**Turnips.**—Sow for succession in a cool shaded situation.

## June.

If during this month dry weather set in, the water-pot or other means of supplying water to the roots of plants will be needful; but in no case should this be done unless it can be regularly carried out until rain comes. Heavy mulching after thorough waterings will be now of great service to surface-rooting plants, and especially where the soil is shallow and of a naturally dry character. Where the ground has not been previously well prepared it is difficult to deal with it after the crops are in and growing; nor will all kinds of vegetables bear treating in one uniform way—as the deep stirring of the soil between the rows, that will be of the greatest benefit to such plants as push their roots mostly downwards, would be very injurious to surface-rooting plants that have already occupied the soil to a considerable extent. Where the soil is in a hard, impervious condition, the hoe will be all but useless, and will have to give way to the fork; this should be used freely, digging the ground to a good depth in all cases, without disturbing those roots that have made some progress in entering the soil. Parsnips, Carrots, Beet, Potatoes, Turnips, Peas and Beans of all kinds, will be much benefited by the ground being thoroughly loosened up and left with the surface in a comparatively rough state, until sufficiently acted upon by the drying influence of sun and air, after which, when enough rain comes to moisten it again, the whole will crumble down freely, when the hoe can be used afterwards as required. Spring-planted Cabbages, Cauliflower and Lettuce should have the surface for a few inches forked over, in all cases going as deep as the root will permit; and every shower of rain should now be taken advantage of for transplanting and thinning any crops that may require it.

**Artichoke, Globe.**—Clear the ground of weeds, give a good watering if the roots are dry, and apply a good mulching of half-rotted manure.

**Asparagus.**—Keep seedling beds free from weeds, and give a good watering if the weather be dry; cease cutting towards the middle or end of the month..

**Basil.**—Harden off plants that have been grown in heat, plant them out into a warm sunny border, and keep them well supplied with water at the roots should dry weather set in.

**Beans, Broad.**—A sowing for autumn use may be made this month.

**Beans, French.**—Continue to make large sowings through this month, keep closely picked such plants as are now in bearing, and give abundance of water at the roots if dry weather prevails.

**Beans, Scarlet Runners.**—Plant out those that have been raised in heat early in this month, and make main sowings in open quarters. Earth up those requiring it.

**Borage.**—A sowing may now be made for autumn supply.

**Borecole.**—Prick out seedlings, if not already done; towards the end of the month they may be finally transplanted where they are to remain.

**Broccoli.**—Plant out into open quarters any time this month.

**Brussels Sprouts.**—A small sowing may be made early in the month for late supplies. Plant out where they are to remain all plants of sufficient size.

**Capsicums.**—Shift into larger pots, if large plants are required for indoor decoration. Harden off for planting out of doo
*Plant out those* intended to be grown in pits, frames, etc.

**Cardoon.**—Transplant those that have been raised in heat and gradually hardened off, if not done last month. Make main sowing in open trenches.

**Celery.**—Plant into trenches strong, well-hardened plants, from sowings made in heat, in March.

**Chicory.**—If the main sowing of this has not been made, no time should now be lost.

**Cucumber.**—Plants may now be put out into frames just cleared of Potatoes, and a warm covering should be afforded at night. Shut up early in the afternoon, so as to utilise all the sun-heat possible. Sow for outdoor cultivation, also for growing in cold frames, etc.

**Endive.**—Sow in warm, rich border.

**Gherkins.**—Plant out in sheltered situations those raised in frames, etc., last month; and a sowing may now be made in the open air where they are to remain.

**Lettuce.**—Sow for succession, as advised last month. Water and mulch during dry weather.

**Mushrooms.**—Fire-heat will be no longer necessary. Maintain a moist temperature by gentle sprinklings with tepid water.

**Oxalis.**—These should now be planted, if not already done, as advised last month.

**Parsley, Celery-leaved.**—Transplant into trenches early in the month.

**Peas.**—Make main sowing of late varieties.

**Radish.**—Make frequent sowings, and keep them well supplied with water. If not already done, roots should be planted to produce pods for pickling purposes, as advised last month.

**Rape.**—Make frequent sowings.

**Tomatoes.**—Plant out a full outdoor crop.

**Turnips.**—Sow in a shady spot for autumn use.

**Witloof.**—Sow in deep rich soil, and thin out the plants to 4 in. apart when large enough to handle.

## July.

A SUCCESSION of bright sunny days during this month will render kitchen gardening by no means an easy task. Those who had the means and took the precaution to carry out persistently mulching and shading last month, will be able to appreciate its beneficial influence upon their crops, as well as its value in saving labour in watering; in fact, watering on the bare earth, unless the land can be thoroughly soaked, is of little use. Many kinds of vegetables now come on so rapidly as to make it difficult to keep up the necessary succession; great care should, therefore, be used, in gathering Peas and French Beans, never to allow any of the pods to get too old for use; this has an exhausting influence upon the plants, tends to restrict production, and to shorten the period of bearing; when gathering the crops, also avoid, as far as possible, injuring either leaves or stems. Whenever a favourable opportunity occurs, take advantage of it for the transplantation of such crops as are not already completed; for the sooner all crops that have to stand the winter are in now, the better, in order to get the growth firmly built up before severe weather sets in. Heavily mulching with manure, if not already done, should be applied to such crops as Peas, Beans, Globe Artichokes, etc., after having received a good soaking of water. Successional sowings of salads should still be made under a north wall; and, in order to ensure a rapid and continuous growth, shading even in such a position, during the continuance of hot weather, is almost necessary. Cabbages that have been cut, and the stems of which are pushing again, should have all old leaves removed, the surface of the ground deeply loosened with a hoe, and top-dressed with manure. All vacant spots from which crops have been removed should be manured and dug over in readiness for others.

**Artichoke, Globe.**—Give copious supplies of manure-water if the weather be dry.

**Basil.**—The tops of all plants that are showing flower should now be cut off and dried in a shady place, afterwards storing them away in bunches for winter use. The old stools should then have the ground stirred between them, and receive a dressing of fresh mould; and a supply of green Basil until the beginning of October may by this means be obtained.

**Beans, Broad.**—A few short rows may now be cut down, either after fruiting or when the plants are in bloom, by which means an autumn supply of Beans may be secured.

**Beans, French.**—Make last outdoor sowing not later than the middle of the month. Mulch between the rows of plants coming into bearing.

**Beans, Scarlet Runners.**—Stick or give other support to those requiring it, and make occasional sowings. The last should be made in the middle of this month.

**Broccoli.**—Get all planting done as early in this month as possible.

**Brussels Sprouts.**—Continue to make plantations where successional supplies are in demand.

**Burnet.**—Remove flower spikes as they appear, unless seed is needed.

**Capsicums.**—Early in the month well-hardened plants may be put out in warm situations.

**Celery.**—Plant in open trenches from sowings made in April, to come into use in October and November.

**Chamomile.**—Gather flowers as fast as they open, and spread them out in a shady place to dry.

**Chervil.**—Sow for autumn use.

**Cucumber.**—Plants may now be put out in cold frames, pits, etc. Sow for succession.

**Endive.**—Thin out plants sown last month, or transplant, in rows 12 in. apart each way. The former plan is the better. Make sowings for succession.

**Lettuce.**—Keep up succession by frequent small sowings.

**Mushroom.**—Make new beds and spawn others for autumn and winter bearing. Keep beds in open sheds, etc., moist by gentle waterings, and give warm covering of hay or other litter.

**Mustard and Cress.**—Sow in shady situations once or twice a week.

**Peas.**—Late crops should now be sown.

**Rampion.**—Sowings may still be made.

**Rhubarb.**—Remove all flower-stalks as fast as they appear, unless seed be required.

**Sorrel.**—Sowings may still be made.

**Spinach.**—Sow last summer crop.

**Turnips.**—Sow main crop for winter use.

## August.

LOOK well to hoeing and surface-stirring amongst and about all growing crops whenever a hoe or scarifier can be used amongst them, taking advantage of dry, suitable weather for performing this most essential practice in vegetable culture—which is not for the sake of destroying weeds, vermin and their larvæ alone, neither of which can get a chance of putting in an appearance if this be properly and duly performed, but more especially for the sake of maintaining a healthy, pulverised, sweet preparation for all and every succeeding crop. There is little use in heavy applications of manure and deep culture without a clean, open, sweet, pulverised surface at all seasons, that freely admits the atmospheric influences and the rain as it falls. Never rake the earth's surface, as that would form it into an even-bound floor after the first rain, thus stagnating the growth of advancing vegetation. Don't pick the stones, but allow them to remain so as to assist in keeping open the soil and retaining moisture; but, instead, apply stones and rubble to heavy adhesive soil. Never let it be said that you hoe the earth's surface about and amongst your crops for the sake of destroying weeds, for the weeds should never have a chance to appear. First reckon on the many times you can perfectly perform hoeing and scarifying amongst your crops before a weed has a chance to put in an appearance to the once you can when a crop of weeds has got established, and the earth's surface got hard and bound through exhaustion, and calculate how much you have lost in weight and value of different crops by encouraging a crop of weeds. Keep the ground always cropped, which can be done by foresight in laying your plans; you can likewise improve the land by deep culture, change of crops, and working the soil. Trench in, at all seasons, all available rubbish and refuse vegetation. Liberal supplies of manure and methodical application of salt and air-slaked lime in suitable weather are also very beneficial. August is an interesting and busy month in preparing for autumn sowings and plantings. Trench every spare bit of ground, and continue to plant out all winter crops not already done.

**Angelica.**—Sow on warm border in moist soil.

***Artichoke, Jerusalem.***—Give support to plants in situations where *affected by* wind.

**Beans, French.**—Make a small sowing in cold pits, to prolong as much as possible the supply of Beans.

**Broccoli.**—Plants put out this month will make nice little useful heads.

**Brussels Sprouts.**—Small plantations may still be made.

**Carrot.**—Sow on warm borders, any early kind.

**Cauliflower.**—Sow in dry, open border.

**Celery.**—All plantations should this month be completed. Earth up crops as required.

**Chamomile.**—Gather as advised last month, and when dry store away in paper or canvas bags.

**Chickpea.**—Gather pods that are ripening; if left until fully ripe, they will open and the seed will be lost.

**Corn Salad.**—Sow broadcast in beds, rather thinly.

**Cucumbers.**—Towards the end of the month Cucumbers in pits, frames, etc., will require additional warmth; therefore fresh linings should be applied where no other means of heating is available. The points of some of the shoots may be stopped, to produce side-shoots to make cuttings for planting out next month, when it is desirable to obtain plants for winter by this means. Early in this month a plantation may be made in frames or pits, where linings can be applied later on, when the nights get cold.

**Endive.**—Blanch as required, and make successional sowings.

**Lentil.**—Pull up plants that have ripened their pods, dry them in the sun for a day or two, and hang them up under cover.

**Lettuce.**—Make a good sowing of hardy kinds for late autumn and winter use.

**Marjoram.**—Cut down plants that are showing flower, dry in the shade, tie in bunches, and hang up in a dry shed.

**Mint.**—Cut down a portion that is showing flower for drying. Clean and top-dress the beds thus cleared.

**Onions.**—Sow for standing the winter.

**Peas.**—A small sowing of a good early variety may be made in the beginning of this month, with a view to furnish a few dishes of Peas in November and December

**Pennyroyal.**—Cut for drying.

**Peppermint.** - Cut for drying.

**Radish.**—Sow for succession.

**Rape.**—Sow on warm borders.

**Rhubarb.**—Cease gathering this month.

**Savory, Summer.**—Cut down plants that are showing flower, and dry in the shade, for winter use.

**Spinach.**—Make a sowing of the Prickly variety, for winter use.

**Turnips.**—Sow main crop for winter use as early in the month as possible, if not already done; and towards the end of the month a small sowing may be made, to supply a few small roots before spring-sown crops are ready.

## September.

Pits or frames should now be prepared for the reception of Lettuce and Endive, in the event of sharp frosts occurring in October or November. Pits which have been used for Cucumbers or Melons, if the manure is not immediately required for digging in the land, will require to have the soil on the top thoroughly stirred, all roots taken out, and, if dry, moistened, so as to have it in a thoroughly healthy growing condition. In thus making provision for autumn and early winter salads, every one, of course, must be guided by the demand they will have to meet. As fast as crops are cleared away, the ground should be well manured, dug or trenched, and left in a rough condition, unless it be immediately required for other crops. Keep weeds well in subjection by the vigorous use of the hoe, for if allowed to gain ground it will be found a difficult matter to get rid of them when wet weather sets in, which may now shortly be expected.

**Angelica.**—Sow on warm border in moist soil, if not done last month. Thin out plants that are up from last month's sowing to 4 in. or 5 in. apart.

**Artichoke, Globe.**—Make new plantation, if required, by dividing such plants as produced heads early in the season. Cut out all overgrown heads, to prevent them weakening the plants.

**Beans, French.**—Make sowing in heat, for indoor culture.

**Cardoon.**—Earth up early-sown plants, choosing a dry day for the operation.

**Carrot.**—Sow Early Horn varieties on warm border for spring use.

**Cauliflower.**—Sow in open borders, in drills or broadcast, if not already done.

**Chervil.**—Sow early in this month for winter supply. Sow the tuberous-rooted variety, and harvest last year's crop, and store away in a dry shed or cellar.

**Corn Salad.**—Make successional sowing.

**Cucumbers.**—Sow seed or strike cuttings early in this month for planting out for winter work, and plant out at the end of the month in warm soil, and in a moist temperature of 65° to 70°.

**Fennel.**—Cut off all flower-stalks as they appear; otherwise, instead of Fennel being a useful herb, it will transform itself into a troublesome weed.

**Garlic.**—Pull up the roots as soon as the foliage becomes yellow, leaving the bulbs in the sun for a few days to dry, during which time they should be frequently turned. When dry, tie them in bunches and hang them up in any cool shed.

**Lavender.**—Cuttings of the young wood may now be taken off and inserted in pans, filled with sandy soil, and placed in a close pit or frame, until they have taken root.

**Lentil.**—If not already done, pull up plants, as advised last month.

**Lettuce.**—Sow a hardy variety in the middle of the month, to stand the winter. Transplant into cold frames small plants, to grow on and furnish a winter supply.

**Mushrooms.**—Make large beds for winter supply.

**Onions.**—Pull up the spring-sown crop as early in the month as the ripeness of the bulbs will allow. Turn them constantly in the sun for a few days, and take them under cover.

**Oxalis.**—Towards the end of the month the crop may be lifted, and after being dried in the sun, stored away in any dry place from which frost is excluded.

**Rue.**—Cuttings may now be taken off and inserted in sandy soil under hand-lights or bell-glasses.

**Shallots.**—Pull up the crop and dry in the sun for a few days, and store away.

**Spinach.**—Make a sowing for winter supply, in case the sowing last month should run to seed.

**Tansy.**—Divide old stools, and make new plantations.

**Tarragon.**—Cut down plants coming into bloom for drying.

## October.

Now that summer crops are mostly removed from the ground, no time should be lost in manuring all empty quarters, and in trenching and ridging them. The hoe should be kept at work during this month amongst growing crops; all kinds of root-crops will require to be got in or otherwise protected. Collect covering material together, so as to be in readiness for immediate use; fermenting material should also be got together for forcing purposes next month. Manure and vegetable refuse heaps should be kept turned, with a view to more perfect decomposition. Box edgings should now be repaired and replanted, if necessary, manure wheeled on vacant ground during dry weather, and all should be done to forward the work as much as possible before severe weather sets in, when little can be done. All spare sashes of frames, boxes, and all hand-lights and cloches, should now be washed and put in readiness for immediate use.

**Angelica.**—Thin out plants that are large enough to handle, to 4 in. or 5 in. apart.

**Asparagus.**—Seed may now be sown (if ripe) in drills 1 ft. apart, in light rich sandy soil.

**Basil.**—Take up and pot, or place in boxes, plants that were cut down in July and that have since formed bushy heads. Place them in any cool house, and they will give a supply of green Basil for a long time to come.

**Beans, French.**—Make successional sowings in heat. Earth up such as require it.

**Beet-root.**—Lift this crop, and store away in sand or dry mould in a cool shed or cellar, or clamp the roots out of doors in the same way as Potatoes, etc.

**Broccoli.**—Plants growing too robust may at the end of the month be checked by layering them with their heads towards the north or north-west.

**Brussels Sprouts.**—A small sowing may be made this month, for an early supply.

**Cardoon.**—During this month every available opportunity must be taken to earth up these.

**Cauliflower.**—In the early part of the month sowings should be made in cold frames, to provide against failure in the outdoor sowings. Thin out plants that are become too thick in seed-beds.

**Celery.**—This should now receive its final earthing; if deferred longer, dry days can seldom be obtained for the operation, which is the most essential when earthing winter Celery.

**Chervil.**—Towards the end of this month plants should be taken up and planted in frames, etc., for winter supply.

**Corn Salad.**—Make large sowing for winter supply.

**Cucumbers.**—If not already planted, winter Cucumbers should be at once put out; further delay will greatly reduce the chances of the plants gaining strength before dark days set in.

**Endive.**—A sowing may now be made in cold frames, pricking off the plants into other frames, when large enough.

**Garlic.**—Where Garlic is in request early in the summer, bulbs may now be planted.

**Lettuce.**—Transplant small seedlings into pits and frames, etc.; and sow on slight bottom-heat for winter forcing.

**Oxalis.**—If not already done, the crop should be at once lifted and stored away, as advised last month.

**Rhubarb.**—Fresh plantations may now be made, either with plants from seed-beds or by division of old roots.

**Rue.**—Transplant cuttings struck last month where they are to remain.

**Shallots.**—Store away in any dry place. A few bulbs may be re-planted for early summer supply.

**Thyme.**—Cut and dry for winter use.

**Tomatoes.**– Cut off all fruits from outdoor plants, and place them on a shelf in a warm sunny position under glass.

**Witloof.**—Introduce plants into Mushroom-house, or other dark, warm place, for blanching.

## November.

THE season has now arrived to set about draining all land requiring it, repairing old fences and making new ones, clearing up all water furrows and ditches, making good all walks or road-edgings, The preparation and selection of materials for making new roads and walks, and repairing old ones, should now receive attention. The first part of the mornings should be occupied in wheeling out manure on to spare ground. Continue to trench all vacant ground into rough, open ridges, in order to receive the influence and benefit of the atmosphere. Collect together all kinds of vegetable and fruit-tree leaves, short grass, edgings, and sweepings of roads and walks—indeed, any kind of decomposing refuse. Turn over these heaps on frosty mornings, and mix the compost with some air-slaked lime and salt, which should always be in readiness. A portion of both should be added, in order to exterminate obnoxious insects and their larvæ. Thoroughly incorporate the whole of the constituents of the mass by shaking and turning, and form them into a ridge-shaped compost heap, and a valuable heap of manure may thus be secured for the growth of all kinds of vegetables. Never burn any kind of vegetable refuse, or allow its valuable properties to escape in smoke : all prunings and rubbish that will not readily decompose, either char or stifle-burn, and thus turn to valuable account as manure. All root crops should be now well protected and have frequent attention paid to them, and a quantity of each should always be at hand for present use. Forcing materials must now be attended to; renew linings that are becoming spent; and all work should be got as forward as possible before bad weather sets in.

**Artichoke, Globe.**—Protect with litter, leaves, etc.

**Artichoke, Jerusalem.**—Cut down stalks within a foot of the ground, and strew a covering of protecting material over the rows. Dig up enough tubers for present use.

**Asparagus.**—Cut down all stalks (which will now be withered), clear the beds of weeds, gently prick over the surface with a fork, and give a good dressing of rotten manure, trim up the alleys, and leave it in an orderly manner. Take up strong roots for forcing, and place them on a gentle hotbed. Maintain a temperature of 55° in the frame or pit, increasing it a few degrees after a week or so, by applying hot linings,—or if heated by pipes, more fire heat.

**Beans, French.**—Make sowings for succession; stop such plants as have made two joints ; earth up those requiring it.

**Broccoli.**—Heel in all plants not already done. Protect such as are turning in by strewing a little light fern or straw over them, or by turning their own leaves over the flower-heads.

**Cardoons.**—Earth up all plants, if not already done.

**Carrots.**—Sow French Forcing or Scarlet Horn on gentle hotbeds. Lift outdoor crop, and store away.

**Cauliflower.**—Transplant into cold frames, pits, etc.

**Chervil.**—Protect from frost by means of hand-lights, or old lights, and take up strong plants and transplant them in frames from which the frost is excluded.

**Endive.**—Take up and plant thickly in frames, etc. Protect those left in open ground. Blanch as required for use. Plants raised in frames last month should now be thinned out or transplanted into other frames, 6 in. or 8 in. apart.

**Horseradish.**—Dig up a quantity of roots, and store away in sand or dry soil, for present use.

**Lettuce.**—Take up with a good ball full-grown plants, and place them in a dry shed or frame ; insert the roots in dry soil or sand.

**Mushrooms.**—Extra covering and fire-heat will now be necessary. Admit a dry, sulphury heat, and make and spawn beds as required.

**Parsley.**—Take up roots for planting in frames, or otherwise protecting during the winter. A portion may be covered up out of doors where frames, etc., are not available.

**Parsnips.**—The crop may now be lifted and placed in trenches or clamps out of doors, or be stored away in soil or sand in a shed or cellar.

**Radish.**—Continue to sow in warm situations.

**Rampion.**—Lift the roots and store away in a similar way to Carrots, etc., or protect where they are by a thick covering of ashes or soil.

**Salsafy.**—Take up and store, or protect by mulching.

**Scorzonera.**—Lift the roots and store away, or otherwise protect from frost.

**Seakale.**—Clear away all dead leaves and refuse from among plantations, and draw a little soil round the crowns of such as are to be forced where they stand. Commence forcing.

**Tarragon.**—Protect from frost by means of a thick layer of litter or old Mushroom dung.

**Turnips.**—Keep in a good supply for present use.

**Witloof.**—Introduce into warm, dark place, for succession. Plants may also now be placed in trenches.

## December.

The season has now arrived when occasional obstructions to outdoor operations may be expected. There should be in store and in the mind's eye plenty of work under shelter—such as looking over old stakes and tying them up into convenient bundles; and new ones should also be prepared, by sharpening and tying them in bundles of a suitable length, for the various purposes required. Clean, point, and paint all old labels, and provide new ones of various sizes, having a well-planed face for writing on. Almost any kind of wood will do for common kitchen-garden labels, but common Laurel is the best of all for writing on. Pea and Bean sticks should be got in readiness, and tied in bundles of different lengths to suit the growth of the sorts of Peas or Beans to be planted. Turn over manure-heaps, and prepare heating material for hotbeds, and burn all weeds and rubbish. Add lime to decayed vegetable heaps, and wheel into ground about to be trenched, so that it may be buried deeply in the soil. Every kind of root or vegetable requiring protection against severe frost should be attended to. Protecting material should be provided, and held in readiness for any sudden emergency. Wheel manure on to the land in the early part of the mornings, and trench all spare ground. Look to the drains and watercourses, and see that all are clear; make also new drains where required.

**Artichoke, Globe.**—Protect, if not already done.

**Asparagus.**—Take up for forcing, and cover over a portion, to keep the soil from getting frozen, in order that the next batch may be readily got up. Give abundance of air to that put in heat last month when just coming through the earth, unless it is required in a blanched state, in which case the lights may be covered over and remain so until the "grass" is cut.

**Beans, French.**—Give all light and air possible to plants advancing in growth; maintain a warm, moist temperature; give manure water to those in bloom; make sowings for succession.

**Cardoons.**—Make preparations for protecting these on appearance of severe weather. Take in a few at a time for present use.

**Carrots.**—Sow any Early Horn variety in frames on gentle hotbed.

**Celery.**—Protect from severe frosts by strewing any light, dry material along the rows.

**Corn-salad.**—Protect by means of hand-lights during severe weather, so that it may be readily got at when wanted for use.

**Cucumbers.**—Stop the main shoot of all plants as soon as they reach the top of the trellis, afterwards stopping all other shoots one joint past the fruit. Maintain a moist, warm temperature, and admit air freely at every favourable opportunity. Withhold the syringe from the foliage for some time to come, or mildew will probably be the result.

**Lettuce.**—Keep all plants growing in frames in a somewhat dry condition; give plenty of air on all favourable opportunities.

**Seakale.**—Force in succession.

**Sorrel.**—Take up plants, and introduce them into heat for forcing.

**Tomatoes.**—Sow in heat for pot culture.

# CALENDAR FOR TWELVE MONTHS,

*By W. DENNING,*

## SHOWING WHEN CROPS WERE SOWN AND WHEN THEY BECAME READY FOR USE.

| Sown or Planted. | Description. | When Ready for Use. |
|---|---|---|
| **January 1** | Peas : Sangster's No. 1; Little Gem, Alpha, Dickson's First and Best, and Early Emperor | **May 27, June 8.** |
| " " | Beans : Green Gem, Early Monarch, and Green Long-pod | **June 18.** |
| " " | Potatoes, in frame without heat | **May 7.** |
| " " | Carrots | **May 21.** |
| " " | Cucumbers, in heat, 65° night, 70° day | **March, April.** |
| " 12 | Cucumbers, Sion House, in heat | **April 4.** |
| " 28 | Peas : Early Emperor, Laxton's Alpha, Advancer, and Dickson's Early Favourite | **June 20, July 6; in flower May 30.** |
| " " | Spinach, round | **May 20.** |
| " " | Beans : Broad Windsor and Monarch | **July 1.** |
| Feb. 1 | Carrots, Early Dutch, on leaf bed under lights | **May 28.** |
| " " | Radishes, with the above Carrots | **March 26.** |
| " 3 | Cauliflowers : Walcheren and Early London, in hea | **July 6; put in cold frame March 19.** |
| " " | Tomatoes, in heat | **August on S. walls.** |
| " " | Capsicums, in heat | **August 1.** |
| " 15 | Potatoes, (sprouted) in pit with bottom heat | **May 1 (up March 13).** |
| " " | Radishes, with above Potatoes | **April 6.** |
| " 20 | Potatoes, in cold pit | **June 1.** |
| " " | " under wall (sprouted) | **June 1 (up April 6).** |
| " " | Peas : Nonpareil and Champion of England | **June 20.** |
| " 23 | Lettuce : Paris Cos and Drumhead in heat (put in cold frame on 19th March; planted 22nd April) | **June 10—19.** |
| " 25 | Radishes, under south wall | **April 12.** |
| " | Potatoes, Myatt's Improved, in open border | **June 12 (up April 15).** |
| *26* | *Turnips*, Dutch | **May 25 (up Mar. 20).** |

| Sown r Planted. | Description. | When Ready for Use. |
|---|---|---|
| Feb. 26 | Potatoes, Ashtop, open border . . . | July 7 (up May 6). |
| „ 27 | „ Lapstone „ . . . | July 31. |
| " " | Cauliflower between early Peas . . . | June 29. |
| " " | „ under hand-glasses . . | May 20. |
| March 2 | Potatoes: Forty-fold . . . . . . | July 25. |
| " " | Shallots. . . . . . . . . . | July 21. |
| " " | Garlic . . . . . . . . . . | July 21. |
| " " | Onions: White Globe, Brown Globe, James's Keeping, etc. . . . . . . . | In good time (were coming up April 16). |
| " " | Radishes, with the Onions . . . . | May 10. |
| " 5 | Celery: Incomparable White and Coles' Red, and Ivery's Pink Nonsuch (a very good sort) in heat . . . . . . . | August 12—30 |
| " 7 | Leeks, London Flag . . . . . . | August. |
| " 13 | Radishes, in cold frame . . . . . | April 21. |
| " 17 | Carrots, Early Horn, in frame . . . . | June 15. |
| " " | Cauliflower: Walcheren and Early London, in leaf-bed frame . . . . . . | July 4. |
| " " | Tomatoes, red . . . . . . . . | August 8. |
| " 18 | Peas: Dickson's Favourite, Veitch's Perfection, Champion of England . . . . | July 1—10. |
| " 20 | Parsley, Curled . . . . . . . . | June 15. |
| " 21 | Cabbage planted out, autumn-sown . . | June 15. |
| " 24 | Celery (main crop); viz., Coles' Defiance Red, Ivery's Pink Nonsuch, Hood's Dwarf Red, and Incomparable . . . . . | October 20. |
| " 25 | Cauliflower, planted out all autumn-sown . | June and July. |
| " 26 | Lettuce: Paris Cos and Malta (leaf-bed frame) . . . . . . . . . . | June 10—20. |
| " 31 | Carrots, Early French Horn . . . . | |
| " " | Turnips, Snowball . . . . . . . | June 10. |
| " " | Cauliflower, Walcheren . . . . . | August 28. |
| April 1 | Peas: Veitch's Perfection, Champion of England, and Culverwell's Marrow . . | July 8. |
| " " | Radish, Wood's Early, under wall and in frame. . . . . . . . . . . | May 6. |
| " 7 | Bush Basil and Marjoram in heat . . | July 10. |
| " 8 | Carrots: Early Horn, Scarlet Altrincham, and Long Orange . . . . . . . | July 31. |
| " " | Beetroot; Cattell's Pine Apple and Nutting's Selected . . . . . . . . | End of August. |
| " 14 | Peas: Champion, Culverwell's and Veitch's Perfection . . . . . . . . . | July 16 and 23. |
| " " | Beans, Long-pod . . . . . . . . | July 31. |
| " " | Lettuce: Paris Cos, Alexandra Cos, Malta, and Neapolitan Cabbage . . . . | July 31. |
| " " | Borecole—viz., Buda Kale . . . . . | November, December. |
| " " | Brussels Sprouts . . . . . . . | October, November. |
| " " | Savoy, Drumhead, and Green . . . . | November. |
| " " | Cabbage, Colewort, Incomparable . . . | August 12 to 20. |
| " " | Fearnought Cabbage . . . . . . | December. |
| " " | Couve Tronchuda. . . . . . . . | October. |
| " " | Cauliflower: Walcheren, Lenormand's, and Veitch's Giant . . . . . . . | August 25. |

| Sown or Planted. | | Description. | When Ready for Use. |
|---|---|---|---|
| April | 14 | Broccoli: Snow's, Osborn's, Backhouse's, Grange's Purple Sprouting . . . | November 4. |
| „ | „ | Wilcox, Miller's Late, Dalmery . . | January till May. |
| „ | „ | Surprise and Walcheren, Eclipse, Sutton's, Matchless, Leamington . . . | |
| „ | „ | Bride, Mammoth, and Veitch's Protecting | |
| „ | 15 | Turnips, White Stone . . . . . | June 29. |
| „ | 17 | Cucumbers . . . . . . . . | June 15. |
| „ | 18 | Radishes . . . . . . . . | May 24. |
| „ | 21 | Salsafy . . . . . . . . . | October. |
| „ | 23 | French Beans: Fulmer's, Newington . . | End of July. |
| „ | „ | Celery: Ivery's Nonsuch, in leaf-bed frame | Jan. 1 to Feb. 16. |
| „ | 27 | Vegetable Marrows . . . . . . | July 21. |
| „ | „ | Cucumber: Ridge . . . . . . | July. |
| „ | 28 | Peas: Champion of England, Culverwell's Marrow, Prince of Wales, Veitch's Perfection, behind wall . . . . . . | July 31. |
| „ | „ | Beans, Long-pod . . . . . . . | August 15. |
| „ | „ | Spinach . . . . . . . . | June 30. |
| May | 1 | Radishes . . . . . . . . | June 4. |
| „ | 6 | Cauliflower: Walcheren, and White Cape Broccoli . . . . . . . . | September 23. |
| „ | 7 | Scarlet Runners . . . . . . . | End of August. |
| „ | 9 | Turnips: White Stone and Snowball . . | July 16. |
| „ | 16 | Peas: Champion and Waterloo, Culverwell's Ne Plus Ultra . . . . . . | August 8—30. |
| „ | „ | Beans: Long-pod . . . . . . . | August 20. |
| „ | „ | Lettuce: Paris Cos and Neapolitan . . | August 1—10. |
| „ | „ | Radishes . . . . . . . . | June 22. |
| „ | „ | Cucumber . . . . . . . . | 2nd and 3rd weeks in August. |
| „ | „ | Cauliflowers: Early London, Veitch's Giant and Walcheren . . . . . . . | Sept. 23 to January. |
| „ | „ | French Beans, of sorts . . . . . . | August 20. |
| „ | 80 | Peas: Champion Waterloo, and Culverwell's Ne Plus Ultra . . . . . . . | August 15 to Sept. 10. |
| „ | „ | Spinach, Round . . . . . . | July 1. |
| „ | „ | Endive: Green Curled and Batavian . . | September 17. |
| „ | 20 | Peas: Champion, Culverwell's Prince of Wales, Ne Plus Ultra . . . . . | September 14. |
| „ | „ | Spinach . . . . . . . . . | July 10. |
| „ | „ | Lettuce: Paris Cos, Alexandra Cos, Neapolitan and Victoria (plant largely from this sowing) . . . . . . . | September 17. |
| „ | 25 | Turnips, Red-topped and Snowball . . | August 25. |
| „ | 26 | Cucumber, Syon House . . . . . | August 22. |
| „ | „ | Hauxwell Cabbage . . . . . . | Early spring. |
| July | 8 | Peas: Champion, Tom Thumb, Ne Plus Ultra, and Culverwell . . . . . | September, October. |
| „ | „ | Peas: Sutton's Ringleader and First and Best . . . . . . . . . . | September 7. |
| „ | „ | Radishes . . . . . . . . | August 7. |
| „ | 10 | Lettuce, of sorts, to take up when large and put in frames . . . . . | Oct. and Nov. |
| „ | 11 | Endive . . . . . . . . . | January till May. |

| Sown or Planted. | | Description. | When Ready for Use. |
|---|---|---|---|
| July | 12 | Cabbage: Hauxwell and Imperial . . | March, April, May. |
| „ | 20 | Spinach, Prickly . . . . . . . | September 8. |
| „ | 21 | Radishes, of sorts . . . . . . . | August 15. |
| Aug. | 1 | Radishes . . . . . . . . . | August 22. |
| „ | 7 | Spinach, Prickly (principal: put ashes, a thin layer over bed) . . . . . . | October till May. |
| „ | „ | Cabbage: Enfield Market, Imperial, Cattell's Reliance, Little Pixie, Incomparable, etc. | June 1. |
| „ | „ | Cauliflower: Walcheren and Frogmore . | May 20 to June 20. |
| „ | 14 | Onions: Tripoli and Strasburg (put ashes) | June 29. |
| „ | 18 | Spinach, Prickly (valuable after hard winter) | April 11. |
| Nov. | 14 | Radishes in cool Peach house . . . | March 1. |
| „ | „ | Peas: Sangster's No 1, Ringleader, Dickson's First and Best, Little Gem, and Laxton's Alpha . . . . . . | May 20 to June 11. |
| „ | „ | Beans; Mazagan and Long-pod . . . | June 24. |

# KITCHEN GARDEN RECEIPTS

## Ants.

**Alum Water.**—Take 2 lbs. of alum and dissolve it in three or four quarts of boiling water, letting it stand on the fire until all the alum is dissolved; then apply it with a brush while nearly boiling hot to every joint and crevice in closets, pantry shelves, and the like. Brush the crevices in the floor of the skirting or mop-boards, if there be any suspicion that they harbour ants.

**Bones.**—An effectual way of destroying ants in places where boiling water cannot be used is to lay half-picked bones about. These will soon be covered with ants, and can then be thrown into a vessel of boiling water, after which they should be again laid down to attract a fresh batch of victims. By persisting in the use of this trap a house will be completely cleared of ants in a short time,—the sooner, of course, in proportion to the number of bones employed.

**Camphor.**—If the ants have formed their nest at the root of a plant, pour upon them a quart or so of warm water, in which a piece of camphor, the size of a Hazel Nut, has been steeped. This thoroughly destroys them, and is not in the least injurious to the plant.

**Carbolic Acid.**—Some years ago, says a correspondent in the *Times*, at my house in the country a colony of ants established themselves under the kitchen flooring. Not knowing the exact locality of the nest, I endeavoured to destroy the insects with treacle, sugar, arsenic, etc.; but although I slew numbers thus, the plague still increased. At last, bethinking myself that ants dislike the smell of tar, I procured some carbolic acid, and diluting it with about a dozen times its weight of water, I squirted a pint of mixture through the air-bricks under the flooring. and my enemies vanished that day never to return. It has always been successful.

**Flower-pot Trap.**—Suppose a colony of ants to be commencing operations on a lawn, it is an easy matter to trap them all by placing a large empty flower-pot, with the hole stopped, over it. The ants will build up into the pot, and in a short time it may be lifted with a shovel and carried away and dropped into a vessel of water.

**Guano.**—It is not generally known that fresh Peruvian guano will drive ants from any spot, however firm a hold they may have obtained on it.

**Asparagus Beetle.**—*See* ASPARAGUS CULTURE, pp. 52-70.

## Asparagus Fungus.

THE first symptoms of Asparagus fungus are observable in August. Small dark-brown spots, which in a few days attain the length of one-tenth to one-fifth of an inch, appear on the stalks, and gradually assume a much darker shade. These spots are surrounded by the ruptured epidermis of the stalk, and are somewhat inflated. On close examination, vertical layers of small powdery spots are remarked under the epidermis; and it is their great accumulation here and there which causes the latter to burst. On one point—viz., the dangerous character of the disease—there is unfortunately no room for doubt, and the grower has every reason to be careful that it shall not gain ground, or be imported into districts hitherto free from it. Above all things, he must endeavour to prevent the discharge of the spores—the organs of reproduction—and, as soon as any signs of disease show themselves, his best course is to remove the parts attacked and burn them. Another remedy is to cut a trench round the infected plants, so as to stop the progress of the fungus; as, like most others, it radiates from a centre. It might be that quicklime frequently applied would avert its progress, if not destroy it—few fungi resisting its caustic effects.

## Asphalte for Walks.

THE so-called asphalte used for garden walks has nothing in common with true asphalte, used for the streets in London and Paris. The excellent walks in the metropolitan parks, on the Thames Embankment, in Leicester Square, etc., are made by Mr. Meston in the following manner:—The foundation is made in the usual way with 6 in. of brick rubbish, ballast, or rough gravel, over which is placed a layer of the prepared rough material 2 in. deep, this being well consolidated by a heavy roller; then a layer of the fine material, about 1½ in. in thickness, is evenly spread and well rolled, applying water to the roller to prevent sticking. It should then be sprinkled over with Derbyshire spar or fine beach shingle. Either of these improves the colour and keeps the dark compound of which the walk is made from being seen. The materials are prepared in the following manner:—"A strong fire is made of coal and wood, over which is placed a layer of gravel, out of which the fine part has been roughly sifted. Then a layer of coke breese is laid over the gravel, and when the fire has got through the gravel, another layer of gravel is placed over the breese, and so on until the quantity required has been burnt. While in a hot condition the material is passed through sieves of different sizes, to get rid of the fine dust and separate the material into two sizes, coarse and fine. A flooring of planks is laid near the heap, on which the sifted material is placed and mixed with coal-tar in the proportion of 36 gallons to a yard of material. The rough and fine are laid in separate heaps and used as required.

The place intended to be asphalted must be previously levelled, then put on it a coat of tar, and sift some road-sand or coal-ashes all over it very thickly; after this is dry repeat the operation until you have got four coats of tar and as many of coal-ashes or road-sand. You will then have an excellent, clean, dry, hard path. It will make excellent walks, or floors for sheds, out-buildings, etc., and will wear for many years.

Or take eighteen parts of mineral pitch and eighteen of resin, put them into an iron pot, and place it over a fire; keep boiling a short time; then add to it sixty parts of coarse sand, mix it well together, and lay it on the path to the thickness of 1 in.; then sift a little fine gravel over it, and beat it in before the asphalte sets. This is a more durable asphalte than the former, though it is much more expensive and more troublesome to form.

Another good asphalte may be made with one part mineral pitch, one part resin, seven parts chalk, and two parts coarse sand. Boil them together, and lay it on in a hot state, adding a little gravel, as in the preceding case.

Procure a quantity of road-sand, or similar powdery material, and let it be thoroughly dried; then sift out of cinder-ashes the finer parts, and let that too be made thoroughly dry. Mix these materials carefully, in the proportion of two parts of road-sand to one of cinder siftings. Next provide an iron cauldron, in which coal-tar can be made boiling hot. In a dry place, on a dry day, spread a quantity of the sand and cinder siftings on the ground, as a bricklayer spreads his lime, making it hollow in the middle, and into that pour the hot tar; then incorporate the whole as in the operation of making mortar, and when a stiff paste has thus been formed, spread it over the ground on which the walk is to be constructed, the ground being previously levelled and beaten as firm as possible. Spread the mortar 3 in. or 4 in. in thickness, then powder it over with dry sand, after which a few passes of the roller will press it level, and the work is finished.

Take two parts of very dry lime-rubbish, and one part coal-ashes, also very dry, and both sifted fine. In a dry place, on a dry day, mix them, and leave a hole in the middle of the heap, as bricklayers do when making mortar. Into this pour boiling hot coal-tar; mix, and when as stiff as mortar, put it 3 in. thick where the walk is to be; the ground should be dry, and beaten smooth; sprinkle over it coarse sand. When cold, pass a light roller over it; in a few days the walk will be solid and waterproof.

*Asphalte covering, to harden.*—This must be done in summer: on a hot day, give a coat of coal-tar; this will dry in a few days; then boil tallow, pitch, and tar together, in the proportion of one part tallow, three of pitch, and four of tar. Put this on also, on a hot day; and, if properly done, roofs or paths will require no further care for years. Ten feet square may be tarred with a sweeping brush in ten minutes

## Concrete for Floors and Walks.

After the ground on which the floor or walk is intended to be made is levelled, let it be covered to the thickness of 3 in. or 4 in. with stones, broken small and well rammed; upon which let there be run, about 1½ in. above the stones, one part, by measure, of Portland cement, and two of coarse sand and fine gravel, mixed to a thin consistency with water. Before this coating has become thoroughly set, lay upon it a coat of Portland cement mixed with an equal part of fine sand, and ½ in. thick. The addition of blood will render this compost harder. Concrete for weak foundations, the bottoms of manure-pits or cesspools, when not sufficiently stiff and sound to be impervious to water, may be made as follows:—Newly-burned lime ground to a fine powder, two parts; Portland cement, one part; gravel, broken stone or brick, six parts. Mix the above with water to a liquid consistency, and let it be thrown into its position from a height of 10 ft. or 12 ft., and when partially set let it be well beaten or rammed, to render it solid.

Another Concrete.—Equal parts of gravel well screened, and clean river or pit sand. With five parts of the mixture of gravel and sand mix one part of Portland cement. Mix with water, and apply 2 in. thick.

## Birds and Seeds.

Seeds of all kinds, great and small, are subject to the attacks of birds, more particularly in small gardens; and if nothing be done to prevent it a few finches will destroy a crop in a single day. A good remedy is to dress all seeds with red lead. The dressing, to be effectual, must be done thoroughly. The best method is to place in a large tea-saucer as much seed as it is the intention to sow, on which sprinkle a very few drops of water, for if they be made too wet, the seeds and the lead will stick together in a mass; then take a teaspoonful of dry, powdered red lead, and stir the whole thoroughly until all the seed is well coated with lead; let it stand for a couple of hours to dry before sowing—which is necessary, or the lead will wash off with the rain; whilst, if laid on with the right amount of moisture, and well dried, it will adhere to the outer covering of the seed even when it appears above ground. With a little practice in the preparation of the various seeds that thus fall a prey to birds, the gardener will soon be able to judge when he has hit upon the right degree of moisture required before applying the lead, and upon which depends the perfect preparation. Half a pound of red lead will last a long time, and the trouble is nothing when compared with the blank crops. Paraffin oil has been also recommended. An experiment lately made, for the purpose of testing its power to keep birds from eating seeds when sown, proved so far successful that, of a handful of Radish seed soaked in the oil for fifteen minutes and then sown, not a seed appeared to have been taken, for a came up freely, and no protection was afforded, although birds were very abundant. Petroleum or benzoline would of course answer the same purpose.

## Cabbage Grub.

In old soils all the Cabbage kind, Broccoli and Cauliflowers especially, have a tendency to form club roots, owing to the attacks of the Cabbage Grub or larva of the *Curculio contractus*, a small insect belonging to the beetle tribe. The damage it causes is often a serious matter for the gardener, as it nearly destroys whole crops, and makes very inconvenient gaps, especially in summer Cauliflowers. When the grubs first attack a crop there is nothing to indicate their presence until the plants begin to turn an unhealthy colour; then they flag in the sun, and in a few days the crop is lost. There is no variety of the Cabbage tribe quite free from this pest, although the different kinds of Winter Kale, as well as Red Cabbage, are less frequently affected than Cauliflowers and summer Cabbages.

**Lime and Soot.**—One of the best methods of preventing the inroads of Cabbage grubs is to make each plant unpalatable to them. In the spring procure some newly-burnt lime, and lay it under cover until it becomes air-slaked. Then take an equal quantity of soot and mix it with the lime. In planting, the holes are made with the trowel in the usual way; each plant is dropped into its hole, an inch or so of the soil put over the roots, a good watering given first, then a moderate handful of the soot and lime mixture thrown in each hole, and the remaining soil filled in.

**Soot and Garden Soil** have also been recommended as a specific. Take equal parts of soot and fine garden soil, thoroughly mix them with water to the consistency of thin mortar, and dip the plants in the mixture up to the base of the leaves before planting. This is said to be a safe and never-failing preventive of clubbing.

**Wood Ashes** mixed with water and put into the holes after watering is also a favourite remedy in wood-burning districts. Some ashes should also be incorporated with the soil of the seed-bed, as well as strewed over the ground generally.

In applying the above remedies great care must be taken not to put in the mixture first and water the plants afterwards, as this would have the effect of washing the stems clean and taking the mixture down into the soil away from where it is required, thus affording no protection to the plants.

A correspondent of the *Garden* makes the following statement with regard to clubbing-in Broccoli and Cabbages:—"I have found the following remedy of the greatest service in cases of clubbing-in Broccoli and other varieties of the Cabbage tribe. Make a mixture of Gishurst compound and Pooley's Tobacco powder in a pail of water, adding a little stiff loam to give the mixture some consistency, and well puddle the roots with it before planting; after which give the plants another good watering, especially round the collar of the plant. Since the application of this remedy no fresh cases of clubbing have manifested themselves, while several plants which had become clubbed in the seed-bed are now healthy and vigorous."

## Cabbage Caterpillar.

One of the best methods of diminishing the ravages of this pest is by destroying the chrysalis before it is transformed into the egg-laying, perfect butterfly. When preparing to enter the chrysalis state it leaves the plant on which it has so greedily fed, and seeks a safe retreat and a firm object to which it may attach itself by its silken moorings. The places of retreat most generally selected are the under surface of projecting copings and joints of garden walls, doorways, chinks or hollows in stonework or the under surface of the gutter, beam, wall plate, slips, or other woodwork of sheds and outhouses. When the place is fixed upon, the transformation commences, and the caterpillar becomes the apparently lifeless chrysalis, firmly fixed by a cord of silk to the surface it has selected for its resting-place. It is as well to employ a boy and stimulate his exertions by the promise of a few pence for every pint of chrysalis he collects from the garden and its surroundings; this will be found the best means of abating the caterpillar pest.

**Bracken.**—A writer in the *Belgique Horticole* having observed in the garden of a peasant that the Cabbages were covered with fronds of the common Bracken (*Pteris aquilina*), inquired the reason, and was told by the owner that it was a certain and easy way to get rid of the Caterpillars. He made a trial of the remedy himself, and he states that in one hour after the Bracken fronds were laid on not a Caterpillar was to be seen. Elder leaves are said to be equally efficacious.

**Hemp.**—M. Ad. Sucy, in a letter to the *Revue Horticole*, recommends the use of Hemp for the purpose of destroying caterpillars. He says: "Many years ago I saw an individual sowing broadcast a coarse grey powder on beds of Cabbages, which were almost devoured by legions of caterpillars. On inquiry I found that this was nothing else than the refuse of beaten Hemp, and consisted of fragments of the dried and broken leaves, and particularly of the crushed seed-vessels. In half an hour all the caterpillars had fallen down dead, as if suffocated." He then goes on to suggest the sowing of rows of Hemp in beds of Cabbages, Cauliflowers, etc., stating his impression that the odour of the Hemp plants would exercise a sufficiently repulsive influence to protect the vegetables from the attacks of the caterpillars, and concludes by expressing his opinion that watering Cabbages, etc., with water in which Hemp has been steeped would be attended with equally beneficial results.

## Celery Fly.

THE larvæ of the Celery Fly (*Tephrites onopordinis*) in some seasons do much mischief to the Celery crops, and as yet no effecturemedy has been discovered. When Celery is infested with the larvæ the leaves become blistered and turn yellow; and as the grubs are underneath the blisters, they may be crushed between the finger and thumb. The grubs, when full-grown, descend into the earth, and remain in the chrysalis state until the following spring, when they give birth to the fly, which in due course deposits the eggs on the leaves. Therefore, to prevent the attack of the pest next year, leaves badly infested should be removed and burnt, to prevent the grubs attaining their full development. Mr. Rose, of St. George's Hill, Byfleet, having been for some years troubled with Celery fly, filled a 36-gallon water-barrow with sufficient water to dissolve two 1-lb. boxes of Gishurst compound, mixing with it 1 lb. of Pooley's Tobacco powder, filling up the whole with boiling water, and stirring all well together. The mixture, after being allowed to stand for some twenty-four hours, was used to water the affected Celery plants—a watering-can with a very fine rose being employed for the purpose. The plants, having been well saturated with this mixture, were then examined, and the grubs which had burrowed into the leaves were all found to be dead. The crop, too, seemed to be greatly improved, the mixture having evidently acted not only as an insecticide, but as a fertiliser. About three weeks after he repeated the same treatment with another crop, with precisely the same results.

## Cockchafers.

THE *Melolontha vulgaris*, or common Cockchafer, is a most destructive insect, both as a grub and in the perfect condition. The remedies which have been proposed and tried, with more or less success, are numberless. They almost all, however, bear upon the dislodging of the insects from a particular spot, rather than upon a more summary mode of dealing with them. Perhaps the most efficacious is the collecting of the grubs. The collecting, however, must be continuous and not intermittent, and must be persisted in as long as any are to be seen. The grubs are collected in working the ground. Here the depth at which the insects are lying at the time must be kept in mind, in order that they may be brought to light; and when gathered together they should be destroyed by burning them. Half-decayed Cabbage leaves, or indeed the refuse of any cruciferous plant, should be dug into the ground. It seems that the cockchafer grub cannot stand the leaves of any of the cruciferous plants in a state of fermentation—the sulphurous emanations given off by them being poisonous to the insect. Planting Cabbages or Turnips in ground infested by the cockchafer grub is said to be effectual in driving them away.

## Cockroaches.

COCKROACHES are often great pests in Mushroom-houses and other places, where they devour everything within their reach.

**Arsenic.**—Mix some arsenic with honey, and lay it on scraps of paper about the floor for them to eat. If arsenic be mixed with boiled Potatoes, and laid about in the same way, it will answer the same purpose.

**Bracken.**—Another remedy is said to be to procure some Bracken (*Pteris aquilina*) or common Fern, plentiful on commons, and put it down about the house at night. The black beetles will eat it ravenously and soon die, and their relatives will pick their bones. It is commonly used in the north of England.

**Oatmeal.**—Bait them well with oatmeal for three or four successive nights, or until such time as they feed greedily on it; then mix some arsenic with the meal for one night, repeating the process from time to time if necessary. Mr. Wilson states that if a bowl be wrapped round with a wet cloth they will get into the bowl, from which they cannot escape.

**Phosphorus.**—A very simple and effectual remedy is given in the *Revue Horticole*, communicated by M. Loury, chief propagator at the Jardin Fleuriste, Paris. It is as follows:—Dissolve the heads of a couple of boxes of common phosphorus matches (not *Safety* matches) in a pint and a half of water; then mix with it about 1 lb. of flour, and add about ½ lb. of sugar, of which these insects are very fond. The mixture may then be distributed in various parts of the house overnight on pieces of board, slates, etc., and when examined in the morning, numbers of dead cockroaches will be found close to wherever the poison has been laid.

The remedies given for Crickets are equally effective in the case of Cockroaches.

## Crickets.

CRICKETS are often troublesome in Cucumber-houses and elsewhere, and they may be got rid of in the same way as Cockroaches, or the following remedies may also be tried:—

**Arsenic.**—Mix some roasted Apple with a little white arsenic powdered; divide the Apple so prepared into small bits, and place it in saucers in the room at night.—Take 1 pint of oatmeal and 2 oz. of arsenic, mixing with it a little ground Aniseed and Caraway-seed. This should be laid on pieces of paper, in convenient places, for the crickets to partake of it.—Also arsenic and honey may be mixed together, and laid about for them. Lay it in bits, about the size of a small French Bean, on the smooth side of oyster shells, pieces of glass, or broken glazed crockery: it is necessary to use something that has a hard smooth surface, that will not absorb the moisture from it, or it will be so dry after the first night as to render it useless. By using any of the above-named articles it will be fit for use for three nights. But this preparation must be used with caution, as domestic animals will eat it and be destroyed thereby. After being used for three nights the poison gets too dry for the crickets to take it freely. By using it once in three months the insects will not do any serious harm; but where they have been allowed to get to such a head as we see them sometimes, it is necessary to keep laying down the poison every night for a fortnight or so, to bring them well under.

**Rhubarb Leaves** are said to be a cure for crickets. A large bakehouse was some years ago infested with crickets. As the hot weather came on the nuisance became very serious, for crickets were to be found in every possible crevice. The baker was advised to lay some Rhubarb leaves about the place. The light of the next morning revealed nibbled leaves and myriads of dead crickets; and this was the last of them in that bakehouse.

## Daddy Long-legs or Crane Fly.

The grub of the *Tipula oleracea* (Crane Fly, or Daddy Long-legs as it is familiarly termed) is exceedingly destructive to all the Cabbage tribe. The larva is easily known by its long cylindrical body being destitute of feet. The best way of capturing it in Cabbage beds is by setting traps of slices of Turnips or Potatoes fixed to a wooden skewer and sunk a few inches below the surface of the ground. The larvæ will be attracted by them; and if they be pulled up every other day thousands of them may be found attached to the baits, and can be readily scraped off and burnt, while the same baits may be reset.

## Labels.

The following method of preserving wooden labels that are to be used on trees or in exposed places is recommended in a German paper. Thoroughly soak the pieces of wood in a strong solution of copperas (sulphate of iron); then lay them, after they are dry, in lime water. This causes the formation of sulphate of lime, a very insoluble salt (gypsum) in the wood. The rapid destruction of labels by the weather is thus prevented. Bast, mats, twine, and other substances used in tying up or covering trees and plants, when treated in the same manner, are similarly preserved. At a recent meeting of a horticultural society in Berlin, wooden labels thus treated were shown which had been constantly exposed to the weather during two years without being affected thereby.

Excellent labels for kitchen garden crops may be made from Hornbeam stakes as thick as a broom-handle, cut into the required lengths, pointed, and one side made smooth with the knife. This wood is hard, white, and as smooth as glass, and is perhaps the best of all wood for large labels. The common Laurel wood is also very good for this purpose.

## Liquid Manures.

*Liquid Manures*, as a rule, do not receive the attention they *deserve.* All experience leads to the conclusion that manure, of whatever description, is the quickest in its action when applied in a liquid state; consequently, when any crop gives evidence of an insufficiency of support, there is nothing so effectual as liquid manure: this particularly applies to kitchen-garden crops, where the necessary application is practicable. In fact, there are some vegetables that, in their more advanced stages of growth, can only be brought to perfection by the use of liquid manure judiciously applied. The French summer salads, that are held in equal estimation with those they produce in winter, owe their excellence largely to the rich liquid with which they are unstintingly supplied. Lettuces, Radishes, and even Mustard and Cress, that are grown quickly by the use of liquid manure, are as different as can well be imagined from the tough, flavourless, indigestible material of which an English salad is too often composed. The comparatively large plants in the smallest of pots, unsurpassed in their way, which the growers for Covent Garden Market turn out, are striking examples of what may be accomplished by means of liquid manure alone.

**Gas Liquor.**—The ammoniacal liquor obtained from gasworks may be used with excellent results in places where its peculiar odour does not render it objectionable. It consists of a solution of ammoniacal salts, which constitute its principal value, and a number of other compounds, which, if they do no good, do little harm. It is very caustic, and must be diluted with at least six times its bulk of clear water. Even then it must be applied cautiously to delicate plants, otherwise they will become burnt up. If much of it be used, sulphuric acid (oil of vitriol) should be added, in the proportion of ¼ lb. to every gallon, to fix the ammonia. The diluted solution forms an excellent manure for Grass, to which it may be applied in the proportion of 100 to 200 gallons per acre.

**Guano.**—Dissolve 50 lb. weight in 10 gallons of water, and of this strong solution add ¼ pint to every 10 gallons of water.

**Mineral Liquid Manure.**—A solution of sulphate of ammonia, ¼ oz. to the gallon, is much recommended. M. J. Jeannel, an eminent French agricultural chemist, recommends the following formula, but it does not seem to have worked so successfully in other people's hands as in his own. The manure consists of the following:—

| | |
|---|---|
| Nitrate of ammonia | 400 parts. |
| Nitrate of potassa | 250 „ |
| Biphosphate of ammonia | 200 „ |
| Chloride of ammonium | 50 „ |
| Sulphate of lime (gypsum) | 60 „ |
| Sulphate of iron | 40 „ |
| | 1000 |

The salts should be pulverised separately, and then intimately mixed. This manure is applied in the following manner:—Dissolve 62 grains in a litre (1¾ pint) of water; give to the plants according to their state of development, every week from 387

975 grains of this solution (equal to from 1½ to 9 grains of the salt in a solid state).

**Solution of Cow-Manure.**—One part by weight of cow-manure mixed with four parts of tepid water, of which 1 pint weighs 1¼ lb., forms an excellent liquid for watering strong-growing vegetables, such as Cucumbers, Celery, Cabbage, etc.

**Solution of Sheep-Droppings.**—The proportions in this case are 1 peck of fresh manure to 30 gallons of water. The mixture should be well stirred, but allowed to settle before using.

**Solution of Soot.**—A liquid manure formed by adding 6 quarts of soot to a hogshead of water, is very serviceable for watering vegetable plants.

## Mice.

MICE, in their small way, are in some places more destructive than rats. The large bull-headed Grass-mouse eats its way, nibbling innumerable roads and runs in every direction, through old pasture and meadow Grass. The depredations of the field or garden mouse are only too well known to farmers and gardeners, through their activity in digging up whole rows of Pea, Bean, Radish, and other seeds, and hoarding the same for winter store. They will get into Cucumber frames, pits, or houses, dig up newly-sown seed of Cucumbers, and, what is still worse, find their way in when the plants are in full vigour and bearing fruit, and make sad havoc; sometimes gnawing fine plants in full bearing right through near their roots, killing and destroying the whole at once. As a rule mice visit gardens and seed-houses in larger numbers than rats; they are also more difficult to trap, being more cunning; besides, their hunting grounds are distributed over a much larger area, their most mischievous work being confined to the open air. In the majority of cases, therefore, the only hope is in poison, the great question being which is the safest and least expensive mode of administering it.

**Aloes.**—This drug is of great use for keeping mice from eating newly-sown Peas. Dissolve 2 oz. of the best Barbadoes Aloes in 1 gallon of water, and soak the Peas in it for twenty-four hours before sowing. The solution has no mischievous effect on the Peas. Gentian root may be substituted for the Aloes where the latter cannot be procured.

**Ashes.**—Covering the Peas over with a dressing of coal-ashes is also recommended. After the Peas have been sown, and the surface levelled, cover up the rows with a layer of ashes about 2 in. thick, thereby concealing the scent of the Peas.

**Camphor.**—Where valuable seeds are kept in drawers or boxes, they may be effectually preserved from the depredations of mice by mixing a few pieces of camphor with the seeds. The camphor must be renewed occasionally, as it evaporates when exposed to the air.

***Paraffin Oil.***—If Peas be mixed with paraffin oil, in the proportion of a quart to a tablespoonful, and sown wet, no mice will touch them. Petroleum and turpentine are equally effectual.

**Plaster of Paris.**—One of the cheapest and most easily obtained poisons for mice is plaster of Paris and Wheaten flour. Mix one part of plaster and three of flour, and be sure the mixing is complete. As damp soon destroys the efficacy of this mixture, choose dry weather to put the mixture down, and having placed it in convenient spots, turn over it a large empty flower-pot or a slate, to protect it from the weather. As it will rapidly absorb moisture, the mixture must be prepared again and again, in order that the mice may have it fresh and dry. The carbonate of baryta mixture, recommended for rats, has the merit of keeping best, but is much dearer.

**Red Lead.**—This is by some said to be an effectual protection for newly-sown Peas:—Twenty-four hours before sowing steep the Peas in water. Then powder them over with red lead, rolling them about in it so that it may adhere to and cover the entire surface. After this plant them in the ordinary way. When, however, other food is scarce, mice will frequently carry off red lead, Peas and all.

**Resin.**—Peas soaked in salad oil, and then rolled in resin, are thereby effectually preserved from the depredations of mice and birds.

**Traps.**—A very successful trap for destroying mice has been found to be the following:—Bury a rather deep earthenware basin in the earth till it is slightly above the surface, half fill it with water, and plaster the rim inside with lard; the mice, in their efforts to reach the lard, overbalance themselves, and after a short swim perish. Another simple and efficient trap is made in the following manner:—Take a tolerably tight barrel, bore a hole near the bottom as an entrance; throw into it an armful of ears of corn and a handful of rags or waste paper to make a nest, cover it so that the mice may be kept in the dark, and let it stand quietly a few days to give them time to colonise; then plug up the entrance, dash in a few gallons of water, clean it out thoroughly, and set your trap again. Mice are also easily trapped with Peas first soaked and then threaded, two being allotted to each trap, left 1 in. apart on the thread, so as to afford room for the mice to put their mouths to it and bite asunder the thread; this is cut in lengths of 10 in., a knot being tied at each end and pulled into two slit sticks, which are run into the ground to hold up the Peas. On this rest one end of a brick, the other being on the ground; and when the thread is gnawed in two the brick falls on the mouse and kills it. A slate should be laid on the ground for the brick to fall on, and the bait need not be higher than about 2½ in. from the ground. Hundreds of such traps may be set in the course of a day. They are the most simple, inexpensive, and surest mouse-catchers ever invented.—The old figure of 4 trap, the spring trap, and a dozen besides, are too well known to need description.

A good bait for mouse-traps is equal parts of cheese, oatmeal, lard or fat, and chopped tow. Mix these up together into a p so that it can be spread on the end of a stick without string. If held for a time before the fire, so much the better, as it sets fast when cold. One bait will last sometimes for twenty mice.

All natural correctives, such as owls, hawks, stoats, etc., should be rather encouraged. Those who nail up owls and other mice-eating "vermin" on barn doors should think of the plague of mice, which is as surely coming to England as the gamekeeper is eradicating sparrows, hawks, ravens, jays, magpies, etc. Owls prey unceasingly on mice by night and kestrels by day; these invaluable birds to both gardener and farmer should, therefore, be encouraged for this purpose, for without them crops in some places would be devoured by mice. Cats are not of much use to clear a country; they do not catch the mice quick enough. The time to commence war on these destructive rodents is in March or April, when they begin to breed. There are several recipes for the destruction of rats and mice which owe their efficacy to strychnine; but we prefer to allow this article to be so far incomplete, to advising our readers to use this fearful poison.

## Rats.

THE common small water-rat is considered a harmless animal that usually confines its operations to the margins of ditches or small running streams; but, like all the species, it is endowed with a considerable amount of cunning, and is sometimes guilty of committing depredations for which it is held blameless. Broccoli and winter Greens are his especial favourites; he gnaws the bark, and very often eats entirely through the stems, frequently puzzling the gardener as to the manner in which his vegetables have been destroyed. For his size there is, perhaps, no animal so savage and voracious as the common Norway rat; and, if allowed to become numerous, the damage done both to garden and farm produce is immense. Many different plans have been suggested and described for their destruction, both in the way of traps and poisons; but in dealing with poisons some experience in their manipulation is necessary in order to be successful. Where rats are not numerous, they may be got rid of by carefully stopping all holes in buildings with cement, trapping or snaring them in their runs, and afterwards filling up their holes in the banks or hedges with broken glass or some other obstructive material. Rat-holes can also be plugged with tow, hay, or some similar substance soaked in gas-tar, for though a rat may break out of a tarred hole, he will never enter it again. The methods of extirpating rats, all more or less trustworthy, are simply endless. From a large number we select the following, which will be found the most efficacious:—

**Arsenic.**—Oatmeal or wheaten flour, 3 lb.; powdered indigo, ½ oz.; finely powdered white arsenic, 4 oz.; oil of Aniseed, ½ drachm. Mix, and add of melted beef suet or mutton tallow 2½ lb., and work the whole up into a paste.—Oatmeal or wheaten flour, 1 lb.; *moist sugar*, ¼ lb.; white arsenic and rotten cheese, of each 1 oz.; *rat scent*, a few drops.

**Tartar Emetic.**—Tartar emetic, 1 part; oatmeal or flour, 4 parts; beef or mutton suet enough to make all into a paste; rat scent enough to give it strong odour.

**Traps.**—The use of traps as a remedy for rats and mice is greatly to be preferred to poison. Wherever children or domestic animals are about, the use of poisons should be strictly forbidden. In setting traps for rats, it is as well to render the bait especially attractive to them by using one or other of the following rat scents:—Powdered assafœtida, 8 grains; oil of rhodium, 2 drachms; oil of Aniseed, 1 drachm; oil of Lavender, ½ drachm. Mix by shaking up well.—Oil of Aniseed, ½ oz.; tincture of assafœtida, ¼ oz.—Oil of Aniseed, ¼ oz.; aquafortis, 2 or 3 drops; Musk, 1 grain. Work up the Musk and some of the oil with the end of a knife, and mix it with the whole before adding the aquafortis.—Traps should be always baited with some strong-smelling bait: cheese, for instance, should be well frizzled; and bacon and similar substances should be well fried before being used.—One of the best modes of catching rats alive is by means of the common oblong trap with square ends, made solely of wire; one end to open upwards, when set by a fastener from the top communicating with the inside. This shuts with a spring when it is freed from the catch by the rat touching the hook or a platform of wire inside to which the bait is tied. This trap may be used for catching several rats at a time. In addition to a piece of bacon or cheese tied to the inner platform, place the trap on a wooden tray or board (about ½ in. wider than the trap all round), with slips of wood ½ in. high along three sides, leaving one end open for the door of the trap; on this place sufficient meal to bed the bottom of the trap, so that the rats can walk through it without feeling the wire, which scares them. This additional bait induces many to enter at one time, and frequently five or six are inside before the catch is accidentally freed by one of them, when all are caught.—Take a large plant-pot, say 3 ft. in diameter at top and 3 ft. deep; sink it into the ground till even with the surface, and place about 1 ft. of water in it. Then take a deal board 3 ft. long, 6 in. wide, and ½ in. thick; saw off 1 ft. of it, which must be smoothly planed and re-fastened in its place with two easy-working brass hinges; then fasten a weak steel spring on to the longer part of the board and reaching over the saw-cut on to the shorter part, so that by holding the board out horizontally, the spring will just hold this shorter part of the board on a level with the rest. The spring must, however, be only strong enough to do this and a very little more. This trapfall is then placed half-way over the pot of water, and a large stone is placed on the other end to hold it firm. The drop is then well greased on the planed side, and some strong-scented bait is nailed on to the extreme end. The rat will walk on to the drop, which will not yield till he is fairly on; one step more, and down he goes into the water, the drop returning into position for another customer. It is better to put something in the water, quicklime for instance, which will kill the rats speedily.—Co a common barrel with stiff, stout paper, tying the edge round the barrel; place a board so that the rats may have easy access to the top; sprinkle cheese-parings or other food for the rats on the paper for several days, until they begin to believe they have a right to their daily rations from this source; then place in the bottom of the barrel a piece of stone, brick, or clinker, about 6 in. or 7 in. high, filling with water until only enough of it projects above the water for one rat to lodge upon. Now replace the paper, first cutting a cross in the middle, and the first rat that comes on top of the barrel goes through into the water, and climbs on the stone. The paper flies back to its place, and the second rat follows the first. Then begins a fight for the possession of the dry place on the stone, the noise of which attracts the rest, who tempt the same fate—the result being that in the morning one rat, the strongest of the number, is found alive, in solitary possession of the island, all the others being killed or drowned.

## Millipedes.

THE horticulturist must regard Centipedes as friends, but not so the Snake Millipedes or Juli. These are general feeders, consuming both living and dead and decaying animal and vegetable substances. The living animal matter on which they prey is slugs, small snails, earth-worms, insects, and their larvæ and pupæ,—and so far as that goes they may be regarded as friendly to the cultivator; but, on the other hand, they also feed on living plants, and many of them, such as Potatoes, Carrots, etc., are often seriously injured by their attacks on the roots. A sound, healthy tuber has perhaps too tough a coat for them to penetrate, but when they get into the juicy interior of soft, pulpy roots, they soon render them useless. It is very doubtful whether any means have been found of getting rid of these pests. Sprinkling soot and nitrate of soda over the land, and watering it with lime-water, have been recommended, but apparently without much success. It is difficult to damage the insect without damaging the plant attacked. The commonest species are the *Julus terrestris,* a leaden-coloured kind, something like a thickish wire, and *Julus guttatus,* a small, long, threadlike species, too minute and slender to allow anything to be done by direct manipulation. When viewed under a magnifying glass this last species will be seen to be a very pretty little animal, like a pale thread about the thickness of a pin, with a double row of bright crimson spots upon it, and when put in spirits it stains the liquid of a purple hue, to which it itself turns after death. It has no eyes, which has led to its being regarded as belonging to another genus. This is the species which most frequently forces itself upon the attention of horticulturists, and Lilies seem especially the objects of its attacks. Curtis, from his own knowledge, specifies the roots of the Scarlet Runner, and the roots of the Cabbage tribe generally, as having been attacked by them. There are several other British species of Julus—viz., J. Londinensis, J. latestriatus, *J. punctatus*, and *J. pilosus*; and with them should be reckoned the little flat *Polydesmus complanatus*, which seems to be not far behind *J. guttatus* in its mischievous propensities. Millipedes are often popularly, but very erroneously, called Wireworms. The Wireworm is the larva of one of the *Elateridæ* or Skipjack Beetles; the Millipede is not an insect at all—insects proper only having six legs.

## Mole Crickets.

THESE pests, which are much greater enemies to the cultivator in France than in this country, are probably often the cause of much damage to vegetable crops. As soon as a trace of the mole cricket is seen, follow up the run till the spot where it rests is arrived at, then make the hole wide at top, and immediately afterwards fill it with water to the brim. On the top of the water pour a little oil, which will gradually descend with the water and close up the breathing tubes of the mischievous little brute, which begins to perish of asphyxia, and generally comes out and dies on the surface of the earth. They may also be destroyed by means of soapy water being poured into their holes. To prepare the solution, boil, during a quarter of an hour, 18 oz. of common soap in 30 quarts of water.

Traps of various constructions are also used; but it takes up a deal of time to keep them set.

## Moss on Walks.

MIX in a 3-gallon watering-can 20 pints of water and 1 lb. of oil of vitriol; stir it well, and water the middle of the walks, so that 12 yards may be covered by it. If the edging be approached, it should only be by what runs from the walks. The best way to use it economically is to water from the centre to the side literally along the walk. In two or three days Moss and Grass will have disappeared. An old watering-pot should be used, and should be well washed out immediately after, otherwise the vitriol will act on the metal and produce holes in the can. Salt may be also used, care being taken to prevent its spreading so as to injure the turf. A good plan to prevent its being washed to the sides of the walk is to place a small ridge of sand along either side, about 6 in. from the edging, for a few days, until the danger is past. The salt may be applied in a dry state, or with boiling water, which is the quickest.

## Onion Fly.

MANY remedies for the Onion Fly (*Anthomia ceparum*) have been suggested and tried, with various success. Curtis mentions the following: viz., Dressing the beds with nitrate of soda, covering them with a layer of ½ in. of charcoal, mixing it with the earth before the seed is sown; spreading or sprinkling with coal-dust lime, soot, salt, or watering them with a strong decoction of Wormwood, soapsuds, etc. These do not seem to have done much good. Mr. Knowles has tried most of them without effect. Rolling where the soil is light has been recommended; such a soil seems to be more favourable to the development of the fly than that of a stiff, clayey nature, through which it is more difficult for the mature insect to make its escape on emerging from the pupa; and that many must perish in soil of this description is obvious from the fact that numbers of pupæ have been found imbedded in the clay several inches underground, from which it would have undoubtedly been impossible for the fly to get out under ordinary circumstances. Curtis speaks of pulling up the affected bulbs, whose state is first shown by the yellow drooping leaves, and destroying them at once, to prevent further damage, as one of the most effectual cures; as it is hopeless to think of saving the Onion when the grub has established itself in it. The course recommended by Mr. Andrew Murray is for the cultivator, at the time when the fly appears, in April or May, to keep a very sharp look-out and to destroy the first brood, which is his only chance. Let him pass his hands gently over the leaves, and if he find any eggs, let him remove them or crush them gently by hand. If he watch at the right time, it is only a week or ten days' daily examination. It is, perhaps, impossible so to watch on very large crops; although even then, where it has once been found that the eggs are being laid, we think it would be money well laid out to employ many female hands to go gently over the leaves and draw off or squeeze the eggs. M'Intosh recommended that before sowing the ground should be watered with the following mixture:—To 20 gallons of rain-water add 1 peck of unslaked lime, ½ peck of soot that has not been exposed to moisture, 2 gallons of urine, 1 lb. of soft soap, and 2 lb. of flowers of sulphur. When the mixture has settled sufficiently to pass through the rose of a watering-pot, it may be applied. It has also been recommended to sow Onions on ground previously occupied by Turnips, as a preventive of this pest. Nitrate of soda is not only to kill the grub but to improve the crop. It should be used in the proportion of about 4 cwt. to the acre, and not more than two or three times a season. In using the nitrate of soda, it is necessary that the foliage of the Onions be dry, as to let it drop on the plants when they are wet causes a burnt or shrivelled place wherever it touches them. It is a good plan to water after sowing it, or to select a time when a shower may be expected when going to use it.

Make some strong lime-water, and add to it as much soot as will make it into a thin paint, and with this water the crop the moment the maggot appears. This soot mixture is so stimulating a manure, that it should always be used to increase the weight of the crop. House-slops mixed with lime and soot would be still more powerful, both to destroy the maggot and improve the plant; but unless rain followed immediately, it would be advisable to drench the ground with pure water the day after application. Ground intended for a crop of large Onions should be prepared in the autumn, and after being dug over should be watered with a mixture of sulphuric acid and water, made so strong as to burn the tongue. This will destroy every animal in the soil, and the winter rains will wash it away entirely before spring.

## Red Spider.

IF the size of this insect were proportionate to the damage it does to plant-life, it would be much more formidable in appearance than it is; but, being exceedingly small, it frequently escapes detection until the plants upon which it makes its appearance have sustained serious injury. Great numbers of cultivated plants, especially those grown under glass, suffer from its ravages; but such as have thin, soft leaves, like Cucumbers and French Beans, are more subject to it than others. The living insects cannot exist in a low temperature, but their eggs are proof against the lowest temperature of our severest winters. The red spider has a great aversion to moisture in the atmosphere, and still more to its application directly overhead by the use of the syringe or garden engine,—a fact which at once indicates the means most likely to prevent its appearance where water can be used plentifully without injury, in other respects, to the general health of the plants. The fumes of sulphur are most destructive to red spider, and the hot-water pipes in Cucumber-houses, to which red spider finds its way, should be sprinkled with sulphur occasionally, or be painted with a mixture of sulphur and clay. For the first two or three days after the application of sulphur the pipes must not be made so hot that the hand cannot be laid on them with comfort, or the fumes will probably be so strong that the tender leaves will be injured. Sulphur, combined with daily syringing, is said to succeed well when soap mixture cannot be applied. Sulphur, however, is a very dangerous remedy, often doing as much harm to the plants as to their enemy. If the plants be gently sponged over occasionally with tepid water, it will do much towards keeping them free from red spider.

## Snails and Slugs.

ALL who have ever had a garden, or grown a Cabbage or a Cauliflower, have had to contend with snails and slugs. Dryness favours the movements of most vegetable destroyers; but the opposite holds good in the case of snails and slugs, whose greatest depredations are committed during damp weather and in early spring. The damage sustained by seedling Cabbage, Cauliflower, and Lettuce plants through their ravages is incalculable; and it is not the seed-bed alone that suffers, for even after the plants are established in their permanent quarters, they are often eaten over near the surface of the ground and destroyed,—a bed of well-grown, crisp Lettuce, Cabbage, or a row of winter Celery, being a favourite feeding-ground with them. They are equally at home in the

Cucumber-house, with a warm temperature, or under a hand-light of Lettuce or Cauliflower plants, silently doing their work of destruction, unless prevented by hard frost. In the open air, where slugs and snails are more numerous, and where their food abounds in greater quantity than in plant and fruit-houses, we have not an opportunity of fully seeing how they are attracted to a given spot where food suited to their taste exists. In the Cucumber house, and in pits and frames devoted to the cultivation of vegetable plants, slugs are generally troublesome, being introduced by means of the fresh soil, which is frequently required in such places. They have such facilities here for hiding and breeding, that it is difficult to eradicate them if once they are allowed to get to a head; continual trapping and frequent hunting for them by candle-light or early in the morning, is the surest way of getting rid of them. The means required for the destruction of these, like many other garden pests, are almost as varied as the different plants and situations to which their depredations are extended. Preventives, however, are the best remedies.

**Apples.**—As soon as the unmistakable slimy track of the slug is perceived, a few slices of sweet Apple should be scattered about somewhat plentifully. Look over them two or three hours after dark, when the slugs are almost certain to be caught feeding.

**Bran and Chaff.**—Bran is an article of which slugs are extremely fond, and seems to attract them from all quarters. Mr. Coleman, gardener to Lord Somers, adopts the following method of using it:—A lad is sent along all the walks of the garden each evening with a bag full of bran, and he places a handful of it on the borders at every 8 ft. or 10 ft. or so, in a heap; early the next morning he traverses the same ground with an empty bucket, dust-pan, and small broom, the heaps being generally found covered with them; the lad then sweeps the whole into his dust-pan, and empties it into the bucket, and by the time he has finished his walk many hundreds, if not thousands, are thus captured. A week or two of such work, or even a day or two now and then, must be the means of saving a great deal of our garden produce. When collecting the slugs a little salt and water should be thrown into the bucket, which will effectually prevent the escape of a single one when captured, as the salt causes them to sicken and die at once.

**Cabbage Leaves.**—Get some Cabbage leaves, warm them in an oven till hog's lard will spread over the surface; place them overnight near your favourite plants, and almost every slug will be found under them in the morning. It is hardly necessary to say that there must be no salt in the lard. In the case of open borders, Cabbage leaves should be placed every day round the plants to attract the enemy; a lodgment will soon be made on them. They can be looked over in the morning and disposed of, thereby saving the crops from injury. In the case of Cabbage plants pieces of flat tile well greased on the bottom surface should be placed here and there at distances of 6 ft. or 9 ft. apart, and looked over twice a week through April and May.

**Seakale Pots.**—The best traps for the large garden snail are empty Seakale pots, with the lids on, placed on the ground at intervals of a few yards. If these be examined once a fortnight during the autumn, the snails will be found attached to the inside of the pots, and before Christmas not many will escape.

**Lime.**—Quicklime dusted on the ground early in the morning is a good remedy for slugs; but to be effectual it ought to be repeated within an hour, because the slugs have the power of casting their skins, and after getting rid of the lime will seek shelter.—Dusting the crops with soot and lime is more or less effective whilst the weather is dry, but when showery it is washed off as fast as applied; and the dustings may be repeated until the remedy has as injurious an effect as the evil it is intended to check. Lime should be prepared by spreading it out thinly on a damp floor until it has absorbed as much moisture as to reduce it to a powder. The way to apply it is to sow it by hand broadcast. It must be observed that it is only on damp, mild mornings that the slugs will be out in number. If the air be at all dry or frosty, instinct teaches them to keep under cover; but if a favourable day be selected, and the work carefully done, more of these pests will be killed by one dressing in this way than would be destroyed by a whole season's labour with partial measures,—nor is the lime wasted, for it acts beneficially on the land. Lime should not be applied when rain is falling, as in that case its effects are quickly lost.

**Various.**—Amongst miscellaneous remedies may be mentioned slices of fat meat, and scraps of crisp fresh Lettuce. Ashes, sand, barley chaff, short bristles, cuttings from the brushmaker's shop, chopped straw, and brewer's grains are good materials for strewing as baits.

## Surface Caterpillars.

FOR small surface caterpillars the following mixture may be used:—¼ lb. of soft soap dissolved in a quart of boiling water, and filled up with cold to the amount of 4 gallons. Apply the mixture immediately, well wetting the roots of each plant. The grubs will rush to the mouth of their holes, and must be collected and destroyed at once, otherwise they recover, and go down deeper than ever. By two applications of the mixture, which does not hurt the most tender plant, all the grubs may be got rid of.

## Thermometers.

MINIMUM THERMOMETERS are filled with alcohol coloured with a vegetable material; and if exposed to great light or sunshine, that portion which is in the thermometer stem will sometimes become bleached, and in the process deposit a substance which, if it surround the index, will prevent its moving freely in the tube. To adjust a thermometer which is in the state here represented, proceed as follows:—Hold the thermometer in the hand, bulb upper-most, and swing it violently backwards and forwards until the fluid in the ball (which possibly is not bleached) fills the stem entirely; then reverse the action, and swing the bulb downwards. This will have the effect of mixing the two portions of fluid, so that the bleached portion will be again coloured; and if not thoroughly so, repeat the operation. Lastly, stand or hang up the thermometer for an hour, so that any particles of the alcohol hanging about the tube may be drained into the main column. The index will now flow freely in the tube if the experiment have been carefully performed and no air-bubbles left in the tube. These directions apply only to the horizontal spirit thermometers; the upright maximum and minimum thermometers, which are partly filled with alcohol and partly with oil, are too complicated to be set right, except by a skilled workman, when once out of adjustment. All such thermometers should be strictly kept in the shade, as none but mercurial thermometers will resist the sun's heat without risk of being put out of adjustment.

## Turnip Caterpillar.

THIS is the most destructive of all British insects, the Turnip fly not excepted. The egg is laid in June, either on the ground or on some plant, generally a seedling, close to the ground. Hatched in this situation, the infant caterpillar is enabled to attack the young Turnips, Carrots, Cabbage, and other plants. When young its depredations are mostly above the surface of the ground, and it seems to delight in that particular part of a plant which lies between the root and stem; great numbers of young Turnips and Carrots are divided at this spot, the upper part being left to perish on the surface of the ground. The only remedy is looking for the mischief-maker with candle and lantern, and picking up every caterpillar; and it is sometimes destructive to dig between the plants. Some gardeners, after becoming really acquainted with the enemy, sprinkle lime on the ground, or sawdust, soot, salt, and ammoniacal water from the gas-works; but the result of each method is uncertain and unsatifactory.

## Turnip Fly.

THE Turnip Fly (*Haltica nemorum*) is one of the most formidable pests with which the British cultivator is acquainted. Although called a fly, it is in reality a beetle, and is equally destructive both as a grub and as a perfect insect. The remedies proposed for its destruction are simply innumerable, the plan which seems to be perfectly successful in one locality being useless in others. As in many other instances, it seems better to use preventive measures against this insect than to wage hopeless war against it after it has once gained a footing. With regard to preventive measures, the late Edward Newman writes :—"In the counties I have most frequently visited there are generally huge embankments thrown up after the manner of the earthworks of the ancient Britons. On one side there is often a deep trench, on the other side a broad strip of uncultivated land which is occupied by weeds. On the top of the embankment is an assemblage of Hazel, Oak, Maple, and Whitethorn, thickly interspersed with the dwarfed suckers of mutilated Elms. The whole of these fortifications are adorned with a rank and luxuriant crop of Charlock, Hedge Garlic, Docks, Thistles, Knobweed, and Kecks. In such spots I have exercised my sweeping net, and found the Turnip Beetles in swarms. I would recommend reducing these embankments both in number and magnitude, and throw the whole space into the field; when there was an absolute necessity for a fence, I would reduce it to the smallest possible dimensions, and would clear it of Charlock, Hedge Mustard, Docks, Thistles, and Kecks: instead of allowing these weeds to increase and multiply by the dispersion of their seed, I would gather them into heaps, and, watching my opportunity, actually fire them in the face of the enemy day after day in the brightest sunshine, now and then casting a pinch of sulphur into the smouldering, smoking mass. The gain of land would repay tenfold the required labour to harvest the weeds; the weeds themselves would be the only fuel required; and 5s.-worth of sulphur would be enough for a good-sized farm."—With regard to smoking the fields, Mr. Newman observes:—"Experience having taught me that insects abominate smoke, and are killed by the fumes of sulphur, I endeavoured to bring this experience to bear on the Turnip beetle, and found it most successful. Observing that the beetles, when there was any breeze at all, came against the wind, I lighted a series of weed fires on the lee side of a Turnip field, and thus arrested the advance of the invading army. I believe most experimentalists would have lighted the fires to the windward of the Turnips, so that the smoke would be blown all over the field; but knowing the direction the enemy was taking, or would of necessity take, I thought it better to meet him outside the trenches, and thus render the field of battle, if I may so call it, offensive instead of inviting. This strategy was followed until the Turnips were strong enough to resist the invader without any assistance of mine, and the crop was saved."

There are also other preventives which have proved effectual in some cases, but not in others. Sprinkling the plants with quicklime or lime-water, and burning the surface of the land, are said to be effective; trenching the ground deep is also resorted to; and strewing the ground thickly with gas-lime for three mornings after the seed is sown is also said to be effectual.—In small gardens a light frame stuck full of Alder branches, and drawn over the crop, will discompose the enemy; or a strip of cloth 6 in. wide, and well covered with birdlime, may be used with good effect.

## Waterproofing.

**Boots.**—Gardeners are, from the nature of their occupation, liable to suffer from damp feet, and hence the utility of "sabots" when standing about on the damp soil. Some authorities say that it is a bad plan to grease shoes for the purpose of keeping them soft, as it rots the leather, and admits dampness more readily. It is better to make a varnish thus :—Put ½ lb. of shellac, broken into small pieces, in a quart bottle, cover it with methylated spirit, cork it tight, put it on a shelf in a warm place, and shake it well several times a day; then add a piece of camphor as large as a hen's egg; shake it again, and add 1 oz. of lampblack. If the methylated spirit be good, it will be all dissolved in three days; then shake and use, pouring out two or three teaspoonfuls in a saucer, and applying it with a small paint-brush—adding more spirit if it gets too thick. If the materials be all good, it will dry in about five minutes, and will be removed only by wearing it off, giving a gloss almost equal to patent leather. The advantage of this preparation over others is, that it does not strike into the leather and make it hard, but remains on the surface, and excludes the water perfectly.

Another method is to put into an earthern pipkin ¼ lb. of bees'-wax, ½ pint of neatsfoot oil, 3 or 4 tablespoonfuls of lampblack, and a piece of camphor as large as a hen's egg. Melt the ingredients over a slow fire, stir them thoroughly after they are melted, never heating it so much as to make it boil. Make the leather warm, and warm the grease and put it on with a brush. It is not desirable to dry this in before the fire, but allow it to remain on the surface of the leather. A light coat of this kind will exclude the water even if the boots be exposed to the wet all day, and it will not injure leather by rendering it hard. When boots are exposed to wet, wash them clean at night, hang them up where the leather will dry gradually, and put on a little of the above mixture every morning. The leather should not be allowed to become very dry before the mixture is applied.

A pint of boiled Linseed oil, ½ lb. of mutton suet, 6 oz. of clean bees'-wax, and 4 oz. of resin, are to be melted and well mixed over a fire. Of this while warm, but not hot enough to shrink the leather, with a brush lay on plentifully over new boots and shoes when quite dry and clean; the leather remains pliant. The New England fishermen preserve their boots water-tight by this method, which it is said has been in use among them above 100 years. They can thus stand in water hour after hour without inconvenience.

**Calico.**—Waterproof calico for pits and frames may be made as follows :—Old pale Linseed oil, 3 pints; sugar of lead (acetate of lead), 1 oz.; white resin, 4 oz. Grind the acetate with a little of the oil, then add the rest and the resin. Incorporate thoroughly in a large iron pot over a gentle fire, and with a large brush apply hot to a fine calico stretched loosely previously, by means of tacks, upon the frame. On the following day it is fit for use, and may either be done over a second time, or tacked on tightly to remain.

## Eradicating Weeds from Walks.

*Where* garden walks have been properly made, and the Weeds never allowed to seed, hand-weeding after a shower of rain, and rolling directly the surface will bear the roller, are in many places practised with success. But in gardens where gravel walks are extensive, and, as sometimes happens, the gravel is of a coarse, shingly character, which, if disturbed or broken up, involves some difficulty in getting a firm, smooth surface again, a destructive agent of some kind becomes desirable. Almost everything that destroys the Weeds takes some of the bright red colour out of the gravel; but apart from such drawbacks, walks may be kept clean cheaply by the use either of salt or sulphuric or muriatic acids.

**Arsenite of Soda.**—Dissolve 1 lb. of powdered arsenic in 3 gallons of cold water, boil, and keep stirring: then add 7 gallons of cold water and 2 lb. of crushed soda; stir the whole well whilst boiling, and with a rosed watering-pot apply to the walks in dry weather, —from March to May inclusive being the best time. The above quantity will be enough for 25 square yards. An inclining board should be placed at the sides of the walks or Grass, to keep off the hot liquid.

**Carbolic Acid.**—A solution of carbolic acid, 1 oz. to a gallon of water, sprinkled over the path from a common watering-can, will effectually destroy the Weeds, and also kill ants and other small insects that may harbour there. If the walks have Box or Grass edgings, great care must be taken in applying the solution, lest the edgings suffer from its contact, as it is particularly destructive to any sort of vegetation.

**Coal-tar.**—Break up the path, rake off the largest Weeds, and then gather up some of the surface gravel and mix with coal-tar to the consistency of mortar; spread this over your pathway an inch or two thick, cover it again with a sprinkling of clean gravel, then roll, and add another thin coating of gravel to finish off. No Weeds will grow in this, nor will there be any unpleasant smell or injury done to Grass edgings if the tar mixture be put a little thinner on the sides of the pathway.

**Gas Liquor.**—Ammoniacal liquor from the gas works will effectually destroy the Weeds. The liquor should stand at 5 or 6 Twaddell. It is said by some to be more effectual than salt.

**Lime and Sulphur.**—The following method of destroying Weeds on walks is pursued at the Mint in Paris, with good effect:—10 gallons water, 20 lb. quicklime, and 2 lb. flowers of sulphur are boiled in an iron vessel; after settling, the clear part is thrown off and used when needed. Care must be taken, for if it will destroy Weeds, it will just as certainly destroy edgings and border flowers if sprinkled on them. Weeds thus treated are said to disappear.

**Muriatic Acid.**—Mr. Temple, gardener at Packington Hall, Coventry, recommends diluted muriatic acid as a Weed killer. He states that it completely destroys all vegetable life (insect and animal as well) mixed at the rate of ½ pint to the gallon of water. One application of this will keep walks free from Weeds, Moss, or worm-casts for two years. As regards its application, it is only needful to wet the walk with it; in two seconds the Weeds and all insects will be killed, and in a few hours after they can be swept off; or if left it does not matter much, for in a day or so they become shrivelled up, leaving the walks greatly improved in appearance, owing to the gloss it leaves on them. On broad walks it should be put on with a large watering-pot and ordinary-sized rose. It is not necessary on hill walks to put it on so heavily that it will run; for, of course, wherever it touches Grass edgings or Box it at once kills them. Even in the case of narrow walks, however, if carefully used and run through a smaller rose, no harm need be apprehended. As respects conditions, dry weather is better than wet for applying it, as it soaks in before it can be washed to the sides. Other authorities recommend a quart of acid to a gallon of water.

**Oil of Vitriol.**—Choose a clear evening after a hot day, put water into a wooden pail, and add oil of vitriol thereto in the proportion of one to thirty parts of water. Take a well-painted watering-pot, and, beginning at the end of the path, step backwards, watering as you go, taking care to keep clear of the edgings, if Box, etc., and to avoid splashing the mixture over clothes and boots. When done, fill the pail with fresh water and leave the watering-pot in all night to soak out the acid. In the morning the path will not injure boots after the dew is off, and the Weeds will be either all dead or dying. Should one's clothes, etc., get a spot or two, a teaspoonful of smelling salts in water will restore the colour. Let the path remain for a day or two, and then brush off the dead Weeds. One application is generally sufficient for a long time.

Mr. Hobday states that he has found the use of acid more expensive than salt, and certainly not more efficient. It is also very destructive to water-pots, men's clothes, and in fact anything that comes in contact with it; therefore it requires to be used with great care. Whatever plan is adopted in destroying Weeds, the effect in any case will not last beyond one season. Both salt and sulphuric acid in moderate quantities, or when largely diluted, are powerful manures, and one good dressing in a year is sufficient when applied in dry weather. The remedy is much more expensive than hand-picking. What would cost £12 for hand-weeding would amount to about £100 where the acid is used, to do the thing at all satisfactorily.

**Salt.**—Where a large extent of gravel walks and roads has to be kept free from Weeds, a good sprinkling of salt sown over the surface in dry weather is the cheapest mode of doing it; but then its appearance is in some places objectionable. It remains like a miniature snowstorm glistening in the sunshine for some days, till all is dissolved and absorbed. Another way of applying it is in the shape of hot brine (about 1 lb. of salt to a gallon of water), boiled in a cauldron on wheels and drawn off through a tap at the end into watering-pots, and sprinkled over the surface just sufficiently to damp the whole face of the walk; but this plan is on the whole more expensive than simply sprinkling the dry salt on the surface. True, it does not take so much salt, but there is a considerable expense for fuel, and the labour in applying it is very much greater.

But there is this advantage about it,—it gets rid to a certain extent (not altogether) of the objectionable white appearance. Walks impregnated with salt, if not well drained and well made, are nearly always damp in winter. Weeds generally may be completely extinguished by attending to the following directions :—1. Study their habits : without this you are working in the dark ; you are shooting without taking aim, and are more likely to miss than to hit. 2. Have faith that Weeds can be killed. 3. Should you for the first year or two see little benefit from your labour, do not relax your efforts ; you will certainly triumph in the end. This is the experience of all gardeners, and a firm conviction of this truth is one of the strongest incentives to perseverance. 4. Be beforehand with your work ; this is exceedingly important. It is so not merely because Weed-plants can be killed easily just as they commence to grow, but it often happens that many Weeds actually go to seed before they get large enough to attract attention. If the gravel be of a kind that binds easily in a partially dry state, keep down Weeds by weeding when the walks are wet after rain, using the roller immediately after, but do not overload the walks with gravel. If the gravel be coarse, and not easily smoothed down when disturbed, I should then recommend salt, sprinkled upon the surface in the shape of hot brine, if appearances be studied more than expense. There is also another important consideration in connection with the use of salt or acids, and that is the difficulty in some cases of preserving the edgings from all contact with it. Where the edgings are turf, I have never found any difficulty, but where Box edgings are used, the greatest care is necessary. If used near Box edgings, and showers follow soon after its use, in all probability unsightly patches of dead Box will not be uncommon.

## Wireworms.

EVERY kind of vegetable planted on newly broken-up pasture or old turf-land is sure to suffer from Wireworm (the larva of the *Elater lineatus* or Click Beetle), if not perseveringly dressed for the first two years with tolerably liberal dredgings of salt, at the rate of 6 cwt. to 8 cwt. per acre, when the weather is cloudy and rainy, and constant surface-stirring of the soil with hand-scarifying or methodical hoeing on fine dry days, no matter how often performed, in order to well intermix and incorporate the soil. The treatment described, however, will very soon eradicate the Wireworm, and wonderfully improve the growth and health of all kinds of garden vegetation. At the same time, if any part of the ground be pretty well covered with growing vegetation, and it be not convenient to sow or cast on the salt in a regular way evenly over the surface, sow over and amongst the crops broken-up or small pieces and dust of Linseed oilcake. This the wireworms will eat, and then swell up and burst ; but salt is the best remedy for effecting a permanent clearance. It will very soon do so methodically applied, and will also improve the soil for a luxuriant vegetation for the future. As soon as any crop is cleared, apply a dredging of salt and fresh-slaked hot lime; give the surface a deep scarifying; fork and tumble it up into rough ridges, in width according to the crop intended to be planted, and plant or sow halfway up the ridges on one or both sides, or on every other ridge, according to the desired distance,—thus affording a convenience not only of observing the ravages of any stray wireworm or grub, but exposing a good deal of the earth's surface to atmospheric influence; pulverize it afterwards, and hoe and scarify it down in a healthy state so as to torment the enemy. Nevertheless, the best way is, in taking into use or breaking up old pastures either for garden or farm, first to dredge the surface with salt previous to putting plough, fork, or spade into it, and folding sheep on it for two or three nights, applying a dredging of salt, at the rate of 4 cwt. or 5 cwt. to the acre each day, evenly over it. The wireworm is not at all fastidious as to any particular description of food, being equally at home feeding on the roots of a choice Ranunculus, Pink, or Carnation, or in the kitchen garden on the more homely fare of Potatoes or Beet. In some parts it exists in much greater numbers than in others. In the south of the kingdom it is more plentiful than in the north. Alcohol, spirits of tar, nitrate of soda, and salt have been strongly recommended as specifics against their attacks; but are too expensive to be used on a large scale. Frequent turning up of the ground exposes the wireworms to birds, and rooks and starlings have been killed with hundreds of wireworms in their crops; but avoid the supposed remedy of hard rolling: it only protects the wireworms from the birds, and cannot crush them; they are as tough as pin-wire.

## Woodlice.

WOODLICE (*Oniscus asellus*) are exceedingly troublesome when they exist in large quantities. Being almost omnivorous, nothing comes wrong for them. Although seldom very troublesome to kitchen garden crops, they are very destructive when they gain a footing in Cucumber houses or pits, sometimes eating off the plants close to the roots. In the Mushroom-house they are also a very great nuisance, for here everything exists congenial to their taste—warmth, food, and material in which to lodge. If they exist in great numbers, boiling water poured down the sides of the beds up to the wall will destroy all with which it comes in contact. The little pots with the Potato baits can be used with advantage; but taking time by the forelock, in destroying them before they exist in numbers sufficient to do much harm, is the right way.

**Boiling Water.**—Where frames are infested by woodlice, the most effectual remedy is to pour boiling water round the inside of the woodwork, care being taken not to touch the leaves or roots of the plants in the frames.

***Horse-droppings.***—Woodlice are extremely partial to horse-droppings in a half-dry state; where they exist in quantities, a number of 10-in. or 12-in. pots may be kept, filled with droppings, and placed wherever they congregate. If these be taken out and emptied once a week, the insects destroyed, and more droppings put in, they may be soon reduced in number, so as to be incapable of much harm.

**Poisoned Parsnip.**—Cut a Parsnip into small squares, get an old pot or saucepan to boil it in, mixing a small portion of arsenic; boil long enough to cook the Parsnips soft but not to break the pieces, then place them about the houses infested by woodlice. Great care should be exercised in the use of this remedy, as it is a most dangerous preparation, but most effectual for the destruction of woodlice.

**Potatoes.**—Put a cold boiled or roasted Potato into a small flower-pot, cover the Potato with Moss, leaving a little hanging out of the pot by way of enticing the insects to enter; then lay the pot on its side in a corner of the frame. Woodlice feed in darkness, and at the approach of day they trot off to their hiding-places in cracks and crevices, or amongst the loose soil or bark; the Moss is therefore necessary to induce them to remain in the pot, to which they will flock in hundreds after having once tasted the Potato. Every morning the pots should be taken out of the pits and the insects destroyed. The same bait will serve for a week or longer. If properly attended to, half a dozen pots so prepared will soon clear a frame of this troublesome pest.

**Various.**—If a toad or two be kept constantly in the house, they will devour a great number.—Lay little heaps of Lettuce leaves in cool, quiet places, and examine them at dusk and daybreak.—Lay about also in the neighbourhood of choice subjects young Cabbage leaves slightly smeared over with rank butter or lard.—Lay about in cool quiet spots small heaps of fresh brewers' grains; catch and kill as before.—Where woodlice abound, take some dirty flower-pots (always combine a little dirt of some sort with vermin traps, for vermin are extravagantly fond of dirt), and fill these dirty flower-pots with dry Moss and crocks mixed together. Place them where the vermin abound, and cover each with a tuft of dry Moss. Have a large pailful of boiling water; take up a pot quietly, and quickly shoot out its contents into the water. You clear away your enemies by thousands in this way; there is no trap to equal a dirty pot filled with dirty crocks, and dirty (but dry) Moss.—If there arise any peculiar difficulty, such as a choice plant being eaten nightly, and you cannot catch the marauder, take a slice of Apple, and surround it with dry Moss in a flower-pot. Take also a slice of Potato, and use it in the same way. Place these two pots one on each side of your delicate subject, but at a distance of 6 in. or so, and at dusk and dawn turn out the contents of each pot quickly, and the marauder will be bagged.—Sweet Apples or Potatoes, scooped hollow and placed upon the pots, will attract them; if these be looked over every day, considerable numbers of the insects will be found underneath.

## Insects in General.

Although the principal insect-pests which trouble the gardener are treated of under their particular headings, it may be useful to say a few words on insects generally, and the best means of destroying them. Preventive measures are the best weapons in the gardener's armoury, and they should be taken towards the beginning of the month of February, or even earlier if the winter be a mild one, in order to prevent future mischief and assure the gardener that anything he does in the early part of the year is like nipping a disease in the bud, and a hundred times more valuable than anything he can do at a later period, when his enemies, if more apparent, are more numerous and more rampant. In digging, he will meet occasionally with brown, long, barrel-shaped chrysalids in the earth, from ½ in. to 1 in. in length. These he may safely treat as enemies. We strongly advise the young gardener to put any he may find aside in a place where he can see them come out—not so much to make him an adept in entomology, as that he may learn at least the principal forms that come out of the different chrysalids. If he pin a sample or two neatly and put them away in a box or drawer, the knowledge he thus acquires will not be thrown away. The common toad is a voracious feeder on insects, as well as snakes, wasps, and spiders. One of the most potent natural enemies of insects is the dried and powdered flower-heads of the Pyrethrum roseum and P. carneum, sold under the name of Persian Insect Powder, Insecticide Vicat, Dumont's Insect Powder, etc. The specific property lies in the pollen, and it is according to the proportionate amount of it that may be in the powder that it is more or less effective. The manner of using it is to scatter the powder about the roots and over the leaves of the plants affected. It has the effect of causing the insects to fall down as if dead or asleep—even bees and wasps succumbing under its action; the larger insects, however, by-and-by recover, as if coming out of a swoon, but the smaller never come out of it. The commercial insect powder is very liable to failure, being adulterated with sawdust or the dried and powdered flowers of some of the Anthemidæ; but a powder prepared as follows from the Pyrethrum roseum is most effective against moths, fleas, bed bugs, poultry vermin, and other insect plagues. Seeds of the Pyrethrum, which are obtainable from large seed dealers, are to be sown in May, not too thickly, in a well-cultivated bed; and if the weeds be kept down, will develop into strong plants by the autumn, although they seldom bloom before the next May or June. The flowers are to be plucked as they become fully developed, and the yellow disc-flowers separated from the red ray-florets, thoroughly dried in the shade, and finely pulverised. Flowers can be plucked even in the autumn, so that a few plants will produce a considerable quantity of the powder. As the plant is perennial, it can be propagated by *division;* and since it is indigenous to the Caucasus, it is not *damaged* by a low winter temperature. There are other powders which are also destructive to insects, but not to the same extent as P. carneum and P. roseum. The true kind made from P. roseum or P. carneum is rarely to be met with at all. It is not difficult to distinguish between powder made from these species and powder made of other Anthemidæ, provided they are both genuine, and composed of the pollen in which the virtue chiefly resides. Under the microscope the pollen spores of Pyrethrum roseum, for example, have needle-like projections, while those of the Anthemidæ have been rounded. But the fact is, in the majority of samples no spores of pollen·are to be seen at all. Mr. Andrew Murray has examined a number, for the purpose of endeavouring to determine from what species the powder has been manufactured, but he failed in discovering it. In no instance did he find any pollen at all—nothing but broken fragments of epidermis, of leaf, flower, or branch. Another test is the scent. Good powder has no scent, and the colour should be a dull, dirty drab.

Poke Root (Phytolacca decandra) is also destructive to insects. Dr. F. C. Renner, of Frederick County, Maryland, writes to the Department of Agriculture at Washington, that several years ago he collected some Poke Root for medicinal purposes, and placed it in various parts of the house to dry. After several days he observed that there were many cockroaches lying dead, and upon examination he found they had partaken freely of the Poke Root. Some of the Root was placed near their haunts, and the result was that it rid the premises of those insects. Since then he has communicated the remedy to others, who have tested it with satisfactory results.

According to M. Charles Baltet, the celebrated fruit-grower of Troyes, the Eucalyptus is a most efficient insectifuge. In a letter to the *Illustration Horticole* M. Baltet says :—"Lately my brother-in-law, Captain Mignard, being very much disturbed in his sleep by mosquitoes, took it into his head to place a young plant of Eucalyptus in his bedroom over night. From that moment the insects disappeared, and he slept in comfort. I have been following his example with the same result. Should this really prove generally efficacious, our southern provinces will be freed of one scourge. People will use young plants of Eucalyptus instead of mosquito curtains." A few Tomato plants trained across the windows will also have the same effect.

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